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Item 3(b) of the provisional agenda
Reporting from and review of Parties included in Annex I to the Convention
Compilation and synthesis of sixth national communications and first biennial reports from Parties included in Annex I to the Convention

Compilation and synthesis of sixth national communications and first biennial reports from Parties included in Annex I to the Convention

Note by the secretariat

Addendum

Policies and measures; past and projected greenhouse gas emission trends; quantified economy-wide emission reduction target and progress towards the target; and provision of financial, technological and capacity-building support to developing country Parties

Summary

This document contains the first part of the compilation and synthesis of the sixth national communications and first biennial reports submitted to the secretariat by Parties included in Annex I to the Convention. It provides information on a range of issues relating to the implementation of the Convention, such as: national circumstances; greenhouse gas emission trends; projections and estimates of the total effect of policies and measures; quantified economy-wide emission reduction targets and progress made towards their achievement; policies and measures; and the provision of financial, technological and capacity-building support to developing country Parties.

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I. Introduction

1. The 2014 compilation and synthesis of the sixth national communications (NC6s) submitted in accordance with decisions 9/CP.16 (under the Convention) and 10/CMP.6 (under the Kyoto Protocol) and the first biennial reports (BR1s) submitted in accordance with decision 2/CP.17 consists of three separate documents. The main report, which includes information on all reporting elements following the "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications" (hereinafter referred to as the UNFCCC reporting guidelines on NCs) and the "UNFCCC biennial reporting guidelines for developed country Parties" (hereinafter referred to as the UNFCCC reporting guidelines on BRs), is published in two separate parts: part one, presented in this document, contains a synthesis of the reported information on national circumstances, greenhouse gas (GHG) inventories, emission projections, quantified economy-wide emission reduction targets and progress made in their achievement, policies and measures (PaMs) and the provision of financial, technological and capacity-building support to developing country Parties; and part two, presented in document FCCC/SBI/2014/INF.20/Add.2, which contains a synthesis of the reported information relating to vulnerability assessment, climate change impacts and adaptation measures, research and systematic observation, and education, training and public awareness. An executive summary is contained in document FCCC/SBI/2014/INF.20. All references to Parties in these documents are to Parties included in Annex I to the Convention (Annex I Parties), unless otherwise indicated.

2. This compilation and synthesis report for Annex I Parties includes information from NC6s and BR1s submitted by 31 March 2014. It includes information from all 43 Annex I Parties (42 countries[1] and the European Union (EU)) and from Kazakhstan.[2]

II. National circumstances

3. All 42 Annex I Parties[3] that submitted their NC6s by 31 March 2014 provided information on their national circumstances, which set the context for the levels of and trends in their GHG emissions and removals and underpin their approach to national climate change PaMs. The contextual **information on demographics, economics and energy** was presented in both quantitative and qualitative terms, while the information on **government structure and geographical and climatic profiles** was generally described in qualitative terms only. The reporting on economic development was often underpinned by quantitative information on the gross domestic product (GDP) and the gross value added of the main economic sectors. Sector-specific information on activities in the energy, transport, industry, waste, agriculture and forestry sectors was frequently included in the sections on national circumstances and on PaMs. Information on the building stock and urban structure, passenger and freight transport, distance travelled and vehicle fleet characteristics was also provided by many Parties.

[1] This figure includes Turkey, which submitted its fifth national communication on 17 December 2013.

[2] Kazakhstan is not included in Annex I to the Convention, but in accordance with the conclusions of the Conference of the Parties at its twelfth session (FCCC/CP/2006/5), submitted its sixth national communication in accordance with Article 4, paragraph 2(b), and Article 12 of the Convention, using the UNFCCC reporting guidelines. Kazakhstan has also voluntarily undertaken additional obligations in accordance with Article 4, paragraph 2(b), of the Convention.

[3] There are 43 Annex I Parties under the Convention. At the time of the preparation of this report, Turkey had submitted only its NC5.

4. When explaining the **relationship between their national circumstances and levels of GHG emissions or removals**, most Parties cited climatic, geographical, demographic, economic and energy-related indicators that significantly affect GHG emissions in their territories, such as degree-days, population size, GDP and total primary energy supply (TPES). Some of these indicators are summarized in table 1.[4]

5. Relationships between national circumstances and trends in GHG emissions or removals were described in qualitative terms. Most Parties provided information on their **governance structure and the distribution of responsibilities for energy and climate-related policies**. Several Parties reported that stable institutional frameworks and well-established coordination among involved government departments, commissions and committees on climate change led to wider in scope and stronger climate policy. Many Parties reported that regional and local governments were even more involved in the implementation, and sometimes enhancement, of climate change policies, particularly where **devolution of power by the central governments to the regions is taking place**, such as in Austria, Belgium, Italy, Spain and United Kingdom of Great Britain and Northern Ireland.

6. The **total population of Annex I Parties** was 1,300.17 million in 2012. Since 1990, the total population **has grown by 10.4 per cent**,[5] with growth of more than 20 per cent in 11 Parties (Australia, Canada, Cyprus, Iceland, Ireland, Liechtenstein, Luxembourg, Monaco, New Zealand, Turkey and United States of America) and a decline of more than 10 per cent in 7 Parties (Bulgaria, Croatia, Estonia, Latvia, Lithuania, Romania and Ukraine). In absolute terms, the population has grown most in the United States (+64.10 million), Turkey (+19.78 million) and Australia, Canada, France, Spain and United Kingdom (more than +5 million in each of them) and has declined most in Ukraine (–6.30 million), Russian Federation (–4.76 million) and Romania (–3.13 million). In particular, **Annex I Parties with strong economic growth continue to show significant growth in population owing to immigration** or decreased emigration.

7. Economic production, presented as **GDP** in 2005 United States dollars and converted using purchasing power parity values, **grew by 51.2 per cent, or 1.9 per cent on average annually, in Annex I Parties from 1990 to 2012**. In 6 Parties (Australia, Ireland, Luxembourg, Malta, Poland and Turkey), GDP grew by more than 100 per cent, while in 12 Parties GDP rose by 60–100 per cent. In four Parties, GDP growth was less than 20 per cent (Croatia, Italy, Latvia and Russian Federation). Ukraine is the only Party where GDP declined, by 30.3 per cent.

8. There were considerable differences in the GDP trends between Annex I Parties with economies in transition (EIT Parties) and Annex I Parties that do not have economies in transition (non-EIT Parties).[6] The average annual GDP growth rate in all but two non-EIT Parties (Italy and Japan) was higher than 1.3 per cent but lower than 5 per cent over the period 1990–2012, while for EIT Parties it varied between –1.6 per cent (Ukraine) and 3.8 per cent (Poland). After the initial economic decline in the 1990s in EIT Parties (e.g. Ukraine –59 per cent in 1990–1999; Russian Federation –44 per cent in 1990–1998; Lithuania –44 per cent in 1990–1994; and Latvia –43 per cent 1990–1995), these economies regained momentum and many have maintained higher growth rates in recent years than most of the other Annex I Parties.

[4] For comparability, the data in table 1 and elsewhere in the text of this chapter were obtained from the 2014 annual GHG inventory submissions and from statistics of the International Energy Agency.

[5] The percentage changes given in this chapter were calculated using the exact (not rounded) values and may therefore differ from the ratios calculated with rounded numbers provided in the tables.

[6] The EIT Parties are Belarus, Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Russian Federation, Slovakia, Slovenia and Ukraine.

9. Most **Annex I Parties reported further increases in their transport activities** since their fifth national communications (NC5s), driven by economic growth and in some cases by changes in transport patterns, and identified the transport sector as the largest energy consumer. EIT Parties experienced a dramatic shift from the use of public transport to private cars. In terms of GHG emissions, transport remained the sector with the fastest growth in emissions in virtually all Annex I Parties, with EIT Parties experiencing the fastest growth, and many of these Parties identified increasing emissions from transport as the main challenge in their climate change mitigation policies. A few Parties, including France, Germany, Japan and Portugal, had reported in their NC5s a stabilization of fuel consumption by 2008 in the transport sector, owing mainly to the optimization of engines, increased fuel efficiency in new vehicles and, to a lesser extent, to PaMs targeting transport activities and the shift to transport modes with lower emissions (modal shift). Following a major decrease in energy use in transport and other economic activities in 2008, driven mainly by the economic downturn and high oil prices, many Annex I Parties reported that, with their economies slowly emerging from the recession, GHG emissions from the transport sector could increase significantly by 2020 and 2030 unless effective PaMs are implemented in that sector, which will be central to achieving their targets.

10. The levels of **GHG emissions per unit of GDP** (emission intensity of the economy) and **GHG emissions per capita have continued their downward trend**, but continue to vary significantly across Annex I Parties: the rate of decline of both indicators also varies significantly across Parties. In general, these indicators are higher for Parties that rely on energy-intensive resource-based industries and the production and export of energy resources, as a result of their natural resources endowment (e.g. Australia, Canada, Russian Federation and United States), than for Parties with similar geographic, demographic and climatic conditions but with relatively lighter and less energy-intensive industries (EIIs) (e.g. Finland and Sweden). Despite sharing similar national circumstances and being endowed with energy resources, Norway stands out with its relatively low values for both indicators, owing in part to its hydro-based electricity production.

11. **From 1990 to 2012, the GHG emission intensity of Annex I Parties' economies dropped by 35.5 per cent**, from 0.73 to 0.44 kg CO_2 eq per USD, and the range slightly narrowed in absolute terms from 0.23–2.50 kg CO_2 eq per USD in 1990 to 0.16–1.18 kg CO_2 eq per USD in 2012 (see table 1). In this case, the gap in values that existed between EIT and non-EIT Parties in 1990 has been narrowed, but to a lesser extent: the emission intensity of the overall economy of EIT Parties remains just over twice that of the economy of non-EIT Parties. Similarly, the level of **GHG emissions per capita in Annex I Parties in the period 1990–2012 dropped by 15.2 per cent**, from 16.0 to 13.1 tonnes of carbon dioxide equivalent (t CO_2 eq) and the range among Parties slightly narrowed in absolute terms, from 3.66–33.95 t CO_2 eq in 1990 to 2.54–23.50 t CO_2 eq in 2012. While GHG emissions per capita dropped by 33.0 per cent in EIT Parties (12.20 t CO_2 eq in 2012), a decrease of 8.6 per cent occurred in non-EIT Parties (13.38 t CO_2 eq in 2012), closing almost completely the gap between the values of GHG emissions per capita of EIT Parties and non-EIT Parties.

12. TPES[7] is used to measure the amount of energy consumed in all of the economic activities that contribute to GDP. It includes energy supply from both renewable and non-renewable primary sources, where "primary" means that energy is derived directly from natural resources. Similar to the economic growth patterns of EIT and non-EIT Parties, significant differences in TPES remain between these two groups of Parties. **During the period 1990–2012, TPES increased by 2.5 per cent in total for Annex I Parties,** resulting from the combination of a decline of 22.6 per cent among EIT Parties and an

[7] TPES equals production plus imports minus exports minus international bunkers plus or minus stock changes of primary energy.

increase of 11.8 per cent for non-EIT Parties. Among non-EIT Parties, five saw increases in TPES of more than 40 per cent (Australia, Cyprus, Iceland, New Zealand and Turkey), largely following increases in economic growth and related growth in per capita income, electricity demand and private vehicle use. Notable exceptions to these trends include Slovenia (an EIT Party), for which TPES increased by 22.6 per cent. Among non-EIT Annex I Parties, TPES decreased in Denmark (–0.1 per cent), Germany (–11.0 per cent), Malta (–3.5 per cent) and United Kingdom (–6.6 per cent) between 1990 and 2012. Over the period 2007–2012, most Parties experienced a decrease in TPES, caused largely by the global financial and economic crisis, which led to a slowdown in economic activity and a decrease in energy use.

13. Most Parties rely mainly on two major policy levers to reduce their GHG emissions, which are to increase their use of renewable energy sources (RES) and to improve the energy efficiency of their domestic economic activities.[8] As the share of RES in TPES increases, GHG emissions per unit of energy consumption should decrease. On the other hand, increases in energy efficiency across the economy should result in decreases in TPES (and hence GHG emissions) per unit of GDP. An increased share of RES and natural gas (a fossil fuel of lower carbon intensity) in TPES can, to some extent, be attributed to PaMs. But the exact effect of PaMs on GHG emissions has to be disentangled from other effects, such as technological progress, that would take place anyway, and from price effects that are not the result of PaMs or economic recessions.

14. Many Parties reported a strengthening of measures aiming to improve energy efficiency, especially in the form of regulations in the transport and buildings sectors, as well as measures to increase the share of RES or natural gas. The quantification of the effects of such efforts remains a challenge, but many Parties have started reporting ex-post quantitative estimates related to their efforts. Few Parties reported on the energy efficiency improvements across their overall economy in quantitative terms. However, changes in TPES per unit of GDP over the period 1990–2012 – in other words changes in the energy intensity of a Party's economic output – can be used as an indicator of improvement in energy efficiency. Similarly, examining the change in the share of RES, natural gas and nuclear power in TPES and the related ratio of energy-related GHG emissions to TPES provides an indication of the extent to which reductions in emissions are tied to an increased share of these three sources of energy.

15. **Between 1990 and 2012**, while TPES in Annex I Parties increased by 2.5 per cent (see para. 12 above), **TPES per unit of GDP (energy intensity of the economy) dropped by 28.0 per cent**, from 0.23 toe per thousand USD in 1990 to 0.15 toe per thousand USD in 2012. For EIT Parties, TPES per unit of GDP dropped by 34.6 per cent over the period 1990–2012, with Belarus, Estonia and Lithuania experiencing a drop of more than 60 per cent. In the case of non-EIT Parties, TPES per unit of GDP dropped by 27.0 per cent between 1990 and 2012, with Canada, Denmark, Germany, Ireland, Luxembourg, Malta, Sweden, United Kingdom and United States experiencing a drop of more than 27.0 per cent. Iceland remains the only Annex I Party with a continuous and significant increase in the energy intensity of its economy between 1990 and 2012, owing mainly to the large expansion of its EIIs.

16. **In Annex I Parties as a whole, the share of RES in TPES increased by 62.1 per cent over the period 1990–2012**, from 5.2 to 8.4 per cent. In EIT Parties, the share of RES in TPES increased from 2.4 per cent in 1990 to 4.7 per cent in 2012, a 92.2 per cent increase over the period. For non-EIT Parties, the share of RES in TPES increased from 6.2 to 9.3 per cent between 1990 and 2012, an increase of 50.8 per cent. Over the period 2007–2012, the share of RES in TPES increased in EIT and non-EIT Parties by 14.5 per

[8] Other levers include nuclear energy, natural gas and emission sinks.

cent and 33.0 per cent, respectively, which constitutes considerable progress given that it is a period of six years.

17. Use of natural gas for combined heat and power (CHP) continues to be encouraged by many Parties because its energy efficiency is higher and its associated GHG emissions and air pollution are lower than energy production using other fossil fuels. However, in terms of volume, only a few Annex I Parties are large natural gas producers and exporters (Canada, Norway, Russian Federation and United States). Some Parties that are large producers of natural gas became net importers owing to gradually declining production and increasing demand in recent years (e.g. United Kingdom). The **share of natural gas supply in TPES of Annex I Parties increased over the period 1990–2012 by 24.8 per cent** (from 23.8 per cent to 29.7 per cent), with a steeper increase, of 8.9 per cent, over the period 2007–2012. For EIT Parties, the share of natural gas supply in TPES increased by 18.6 per cent over the period 1990–2012 (35.9 per cent to 42.6 per cent), but that overall increase masks a decrease of 4.3 per cent over the period 2007–2012. Among non-EIT Parties, the share increased by 36.7 per cent over the period 1990–2012 (19.3 per cent to 26.4 per cent), including an increase of 13.0 per cent over the period 2007–2012.

18. These overall increasing trends in the share of RES and natural gas in TPES are clearly correlated with the overall trend in the carbon intensity of energy use (energy-related GHG emissions[a] divided by TPES) in Annex I Parties: **between 1990 and 2012, carbon intensity of energy use decreased by 6.5 per cent** (from 2,726.78 to 2,445.36 kg CO_2 eq/toe). In 1990, EIT Parties' energy use was 16.6 per cent more carbon intensive than that of non-EIT Parties. In 2012, EIT and non-EIT Parties had almost equal carbon intensity of energy use (2,508.75 and 2,429.04 kg CO_2 eq/toe, respectively). The Parties with the highest carbon intensity of energy use in 2012 were, in order, Malta, Greece, Poland, Australia and Estonia, with values over 3,000 kg CO_2 eq/toe. At the other extreme, Iceland, Sweden and Norway exhibited values for 2012 of under 1,000 kg CO_2 eq/toe.

[a] Here, "energy-related GHG emissions" means emissions from the energy sector as reported in the 2014 national inventory submissions.

Table 1
Indicators relating to national circumstances of Annex I Parties

	Population (million)			*GDP (billion 2005 USD using PPP)*			*TPES (Mtoe)*			*TPES GDP (toe per thousand 2005 USD using PPP)*			*GHG emissions[a] per capita (t CO_2 eq per capita)*			*GHG emissions[a] per unit of GDP (kg CO_2 eq/USD)*		
			1990-2012			*1990-2012*			*1990-2012*			*1990-2012*			*1990-2012*			*1990-2012*
Party	*1990*	*2012*	*(%)*	*1990*	*2012*	*(%)*	*1990*	*2012*	*(%)*	*1990*	*2012*	*(%)*	*1990*	*2012*	*(%)*	*1990*	*2012*	*(%)*
Australia	17.17	23.13	34.7	428.92	872.42	103.4	86.38	128.27	48.5	0.20	0.15	-27.0	24.17	23.50	-2.7	0.97	0.62	-35.6
Austria	7.68	8.43	9.8	195.31	306.34	56.8	24.83	33.11	33.3	0.13	0.11	-15.0	10.17	9.50	-6.6	0.40	0.26	-34.6
Belarus	10.19	9.46	-7.1	73.41	142.31	93.8	45.50	30.50	-33.0	0.62	0.21	-65.4	13.66	9.43	-30.9	1.90	0.63	-66.9
Belgium	9.97	11.05	10.8	250.15	363.64	45.4	48.29	55.95	15.9	0.19	0.15	-20.3	14.34	10.54	-26.5	0.57	0.32	-43.9
Bulgaria	8.72	7.31	-16.2	65.60	88.95	35.6	28.22	18.35	-35.0	0.43	0.21	-52.1	12.52	8.36	-33.3	1.66	0.69	-58.8
Canada	27.69	34.88	26.0	773.38	1291.14	66.9	208.57	251.12	20.4	0.27	0.19	-27.9	21.34	20.03	-6.1	0.76	0.54	-29.2
Croatia	4.78	4.27	-10.7	63.99	68.29	6.7	9.03	7.92	-12.3	0.14	0.12	-17.8	6.63	6.18	-6.7	0.50	0.39	-22.0
Cyprus	0.57	0.86	50.4	10.49	20.48	95.2	1.37	2.23	63.1	0.13	0.11	-16.5	10.62	10.74	1.1	0.58	0.45	-22.1
Czech Republic	10.36	10.51	1.4	169.06	250.41	48.1	49.55	42.65	-13.9	0.29	0.17	-41.9	18.93	12.51	-33.9	1.16	0.53	-54.7
Denmark	5.14	5.59	8.8	130.80	180.56	38.0	17.36	17.34	-0.1	0.13	0.10	-27.6	13.62	9.50	-30.2	0.54	0.29	-45.0
Estonia	1.59	1.34	-15.7	16.23	25.35	56.2	9.78	5.52	-43.6	0.60	0.22	-63.9	25.54	14.32	-43.9	2.50	0.76	-69.8
EU-15	365.99	401.67	9.7	8 578.26	12 325.65	43.7	1 300.92	1374.58	5.7	0.15	0.11	-26.5	11.65	9.01	-22.6	0.50	0.29	-40.9
EU-28	477.60	507.40	6.2	9 707.32	14 156.66	45.8	1 644.66	1 643.59	-0.1	0.17	0.12	-31.5	11.78	8.96	-24.0	0.58	0.32	-44.6
Finland	4.99	5.41	8.4	115.39	170.99	48.2	28.38	33.30	17.3	0.25	0.19	-20.8	14.09	11.27	-20.0	0.61	0.36	-41.5
France	58.14	65.43	12.5	1 414.18	1 959.01	38.5	224.01	252.33	12.6	0.16	0.13	-18.7	9.64	7.58	-21.3	0.40	0.25	-36.1
Germany	79.36	81.92	3.2	2 055.81	2 851.34	38.7	351.09	312.53	-11.0	0.17	0.11	-35.8	15.73	11.46	-27.1	0.61	0.33	-45.7
Greece	10.34	11.09	7.3	175.97	234.49	33.3	21.44	26.55	23.8	0.12	0.11	-7.1	10.15	10.01	-1.4	0.60	0.47	-20.6
Hungary	10.37	9.92	-4.3	136.10	169.08	24.2	28.78	23.47	-18.5	0.21	0.14	-34.4	9.41	6.25	-33.6	0.72	0.37	-48.9
Iceland	0.26	0.32	23.1	6.53	10.85	66.2	2.09	5.69	172.2	0.32	0.52	63.9	13.61	13.96	2.6	0.54	0.41	-24.0
Ireland	3.51	4.59	30.8	62.05	165.60	166.9	9.91	13.25	33.7	0.16	0.08	-49.9	15.74	12.75	-19.0	0.89	0.35	-60.3
Italy	56.72	60.91	7.4	1 346.00	1 605.06	19.2	146.56	158.80	8.4	0.11	0.10	-9.1	9.15	7.55	-17.5	0.39	0.29	-25.7
Japan	123.61	127.55	3.2	3 276.52	3 993.81	21.9	439.23	452.28	3.0	0.13	0.11	-15.5	9.99	10.53	5.5	0.38	0.34	-10.7
Kazakhstan	16.35	16.79	2.7	185.49	321.89	73.5	73.45	74.85	1.9	0.40	0.23	-41.3	0.02	0.02	-22.8	0.00	0.00	-54.3

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	Population (million)			GDP[a] (billion 2005 USD using PPP)			TPES (Mtoe)			TPES GDP[a] (toe per thousand 2005 USD using PPP)			GHG emissions[b] per capita (t CO_2 eq per capita)			GHG emissions[b] per unit of GDP[a] (kg CO_2 eq / USD)		
			1990–2012			1990–2012			1990–2012			1990–2012			1990–2012			1990–2012
Party	1990	2012	(%)	1990	2012	(%)	1990	2012	(%)	1990	2012	(%)	1990	2012	(%)	1990	2012	(%)
Latvia	2.66	2.03	–23.6	26.92	32.05	19.1	7.85	4.42	–43.8	0.29	0.14	–52.8	9.84	5.40	–45.2	0.97	0.34	–64.8
Liechtenstein	0.03	0.04	25.6	–	–	–	–	–	–	–	–	–	7.86	6.18	–21.4	–	–	–
Lithuania	3.70	2.99	–19.2	46.22	56.13	21.4	16.06	7.38	–54.1	0.35	0.13	–62.2	13.17	7.24	–45.1	1.05	0.39	–63.5
Luxembourg	0.38	0.53	39.5	16.31	34.94	114.2	3.39	4.09	20.6	0.21	0.12	–43.7	33.95	22.34	–34.2	0.79	0.34	–57.2
Malta	0.35	0.42	18.4	4.84	9.71	100.5	0.70	0.67	–3.5	0.14	0.07	–51.8	5.63	7.49	33.2	0.41	0.32	–21.4
Monaco	0.03	0.04	22.8	–	–	–	–	–	–	–	–	–	3.66	2.54	–30.5	–	–	–
Netherlands	14.95	16.75	12.0	392.86	610.99	55.5	65.69	78.58	19.6	0.17	0.13	–23.1	14.17	11.44	–19.2	0.54	0.31	–41.8
New Zealand	3.37	4.44	31.8	64.30	116.36	81.0	12.83	18.96	47.8	0.20	0.16	–18.3	17.99	17.13	–4.8	0.94	0.65	–30.7
Norway	4.24	5.02	18.4	137.27	238.47	73.7	21.00	29.19	39.0	0.15	0.12	–20.0	11.89	10.50	–11.6	0.37	0.22	–39.8
Poland	38.03	38.54	1.3	311.83	705.63	126.3	103.11	97.85	–5.1	0.33	0.14	–58.1	12.26	10.36	–15.5	1.50	0.57	–62.2
Portugal	10.00	10.58	5.8	161.50	221.39	37.1	16.78	21.39	27.5	0.10	0.10	–7.0	6.08	6.50	6.9	0.38	0.31	–17.5
Romania	23.20	20.08	–13.5	181.49	239.84	32.2	62.25	34.92	–43.9	0.34	0.15	–57.6	10.67	5.92	–44.6	1.36	0.50	–63.7
Russian Federation	148.29	143.53	–3.2	1 872.28	2 178.44	16.4	879.19	756.59	–13.9	0.47	0.35	–26.0	22.68	15.99	–29.5	1.80	1.05	–41.4
Slovakia	5.30	5.41	2.1	63.56	114.81	80.6	21.33	16.65	–21.9	0.34	0.15	–56.8	13.82	7.89	–42.9	1.15	0.37	–67.7
Slovenia	2.00	2.06	3.0	32.73	50.29	53.7	5.71	7.00	22.6	0.17	0.14	–20.2	9.22	9.18	–0.5	0.56	0.38	–33.3
Spain	39.01	46.16	18.3	768.11	1219.94	58.8	90.07	124.97	38.7	0.12	0.10	–12.6	7.27	7.38	1.5	0.37	0.28	–24.4
Sweden	8.56	9.52	11.2	210.25	332.48	58.1	47.20	50.16	6.3	0.22	0.15	–32.8	8.49	6.05	–28.8	0.35	0.17	–49.9
Switzerland	6.80	7.93	16.6	231.14	314.23	35.9	24.36	25.61	5.1	0.11	0.08	–22.7	7.78	6.49	–16.6	0.23	0.16	–28.4
Turkey	55.12	74.90	35.9	436.22	1 015.40	132.8	52.72	116.90	121.7	0.12	0.12	–4.7	3.42	5.87	71.8	0.43	0.43	0.3
Ukraine	51.89	45.59	–12.1	486.03	338.64	–30.3	251.98	122.66	–51.3	0.52	0.36	–30.1	18.12	8.80	–51.5	1.93	1.18	–38.8
United Kingdom	57.24	63.71	11.3	1 283.57	2 068.88	61.2	205.92	192.23	–6.6	0.16	0.09	–42.1	13.61	9.17	–32.6	0.61	0.28	–53.5
United States	250.18	314.28	25.6	8 228.92	14 231.58	72.9	1 915.05	2 140.62	11.8	0.23	0.15	–35.4	24.86	20.64	–17.0	0.76	0.46	–39.7

Party	Population (million)			GDP (billion 2005 USD using PPP)			TPES (Mtoe)			TPES/GDP (toe per thousand 2005 USD using PPP)			GHG emissions[a] per capita (t CO_2 eq per capita)			GHG emissions[a] per unit of GDP (kg CO_2 eq/USD)		
	1990	2012	1990–2012 (%)	1990	2012	1990–2012 (%)	1990	2012	1990–2012 (%)	1990	2012	1990–2012 (%)	1990	2012	1990–2012 (%)	1990	2012	1990–2012 (%)
Total EIT	**321.08**	**303.04**	**–5.6**	**3 545.45**	**4 460.22**	**25.8**	**1 518.36**	**1 175.87**	**–22.6**	**0.43**	**0.26**	**–34.6**	**18.06**	**12.20**	**–33.0**	**1.64**	**0.83**	**–46.4**
Total non-EIT	**856.50**	**997.12**	**16.4**	**22 197.78**	**34 481.06**	**55.3**	**4067.94**	**4550.57**	**11.8**	**0.18**	**0.13**	**–27.0**	**15.29**	**13.38**	**–8.6**	**0.59**	**0.39**	**–33.7**
Total Annex I	**1 177.58**	**1 300.17**	**10.4**	**25 743.22**	**38 941.28**	**51.2**	**5 586.30**	**5 726.44**	**2.5**	**0.23**	**0.15**	**–28.0**	**16.04**	**13.11**	**–15.2**	**0.73**	**0.44**	**–35.5**

Sources: International Energy Agency: Energy Statistics of the Organisation for Economic Cooperation and Development (OECD) Countries Database and Energy Statistics of Non-OECD Countries Database; data for Monaco (population) were retrieved from its sixth national communication and data for Liechtenstein (population) from its national statistics; data on greenhouse gas emissions used to calculate per capita emissions are from the 2014 national greenhouse gas inventory submissions.

Note: For completeness, the table also contains indicators for Turkey, which had not submitted its sixth national communication (NC6) as at March 2014, and for Kazakhstan, which submitted its NC6 in accordance with Article 4, paragraph 2(b), and Article 12 of the Convention.

Abbreviations: EIT Parties = Parties with economies in transition, EU-15 = the European Union and its 15 member States, EU-28 = the European Union and its 28 member States, GDP = gross domestic product, GHG = greenhouse gas, non-EIT Parties = Parties that do not have economies in transition, PPP = purchasing power parity, TPES = total primary energy supply.

[a] Greenhouse gas emissions excluding emissions from land use, land-use change and forestry.

FCCC/SBI/2014/INF.20/Add.1

III. Greenhouse gas emission trends

A. Overview

19. This chapter discusses GHG emission data for Annex I Parties based on information from the 2014 national GHG inventory submissions received by 27 May 2014. It is based on data for all 43 Annex I Parties and for all the years from 1990[10] to 2012. The following information is presented: total aggregate GHG emissions; emissions by gas; emissions by sector; and emission data for individual Annex I Parties. The overall emission trends discussed cover three distinct periods: 1990–2012, 1990–2000 and 2000–2012.

20. Total aggregate GHG emissions over the period 1990–2012 decreased by 10.6 per cent. In the period 1990–2000, total emissions fell significantly, owing largely to the transition to a market economy in EIT Parties, which greatly offset the emission increases in non-EIT Parties. Emissions continued to fall modestly during the period 2000–2012, as emissions increased in EIT Parties (as their economies recovered), while emissions in non-EIT Parties declined.

21. Owing to the global financial and economic crisis starting in 2008, emissions declined to the lowest level during the 1990–2012 period in 2009 (to 16,872 Mt CO_2 eq), but then increased between 2009 and 2010, when economies recovered, by 3.1 per cent. The increase changed back to a decline after 2010, with emissions being lower by 2.1 per cent in 2012 compared with in 2010.

22. The emission reductions are reported to be the result of technological improvements, behavioural changes and economic and demographic shifts – some induced by PaMs implemented to mitigate climate change, others not. As was the case in previous national communications (and reported in the fifth compilation and synthesis report (CS5)[11]), the NC6s and BR1s contain insufficient information to distinguish between the emission reductions resulting from PaMs and those that happened for other reasons.

B. Total aggregate greenhouse gas emissions

23. From 1990 to 2012, total aggregate GHG emissions excluding emissions/ removals from land use, land-use change and forestry (LULUCF) for all Annex I Parties decreased by 10.6 per cent,[12] from 19,064 to 17,039 Mt CO_2 eq. Total aggregate GHG emissions including LULUCF decreased by 16.2 per cent, from 17,976 to 15,066 Mt CO_2 eq. Two main factors underlie these trends: the differences between the trends in 1990–2000, 2000–2007 and 2007–2012, and the differences in the emissions of EIT and non-EIT Parties. The levels of and trends in total GHG emissions for the period 1990–2012 for all Annex I

[10] Unless otherwise specified, base year data are used instead of 1990 data. Parties that may use a base year other than 1990, as stipulated in decisions 9/CP.2 and 11/CP.4, provided data for their respective base years. Such Parties and their base years are Bulgaria (1988), Hungary (average of 1985–1987), Poland (1988), Romania (1989) and Slovenia (1986).

[11] Available at <http://unfccc.int/national_reports/annex_i_natcom/compilation_and_synthesis_reports/items/2736.php>.

[12] All percentage changes in emissions given in this chapter were calculated using the exact (not rounded) values and may therefore differ from the ratios calculated with rounded numbers provided in the tables.

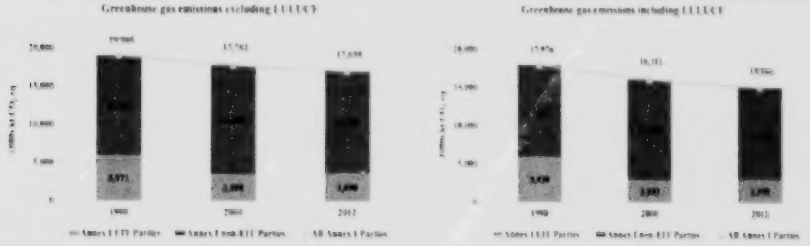
Parties taken together, for EIT Parties and for non-EIT Parties are illustrated in figures 1 and 2.

24. **A substantial decrease in total aggregate GHG emissions occurred in the period 1990–2000** (a 6.7 per cent decrease excluding LULUCF and a 10.4 per cent decrease including LULUCF). The decreases in that period were due mainly to the significant decline in the emissions of EIT Parties. Mainly as a result of the global financial and economic crisis that started in 2008, emissions declined until 2009 (by 2.1 per cent between 2007 and 2008 and by 6.2 per cent between 2008 and 2009). While emissions rose again in 2010 compared with in 2009 (by 3.1 per cent) following economic recovery, they decreased by 2.1 per cent from 2010 to 2012 (a 7.3 per cent decrease excluding LULUCF and a 8.7 per cent decrease including LULUCF between 2007 and 2012). Overall, **total aggregate emissions decreased between 2000 and 2012 (by 4.2 per cent excluding LULUCF** and by 6.5 per cent including LULUCF).

25. **Over the period 1990–2012, the GHG emissions of EIT Parties decreased by 38.1 per cent excluding LULUCF** and by 49.7 per cent including LULUCF. The sizeable decrease in emissions during the period 1990–2000 (by 41.4 per cent excluding LULUCF and by 51.3 per cent including LULUCF) was due to the steep decline in the economies of EIT Parties. With the economic recovery after 2000, the emissions of EIT Parties increased until 2008 but then dropped in 2009 to 3,494 Mt CO_2 eq. From 2010 to 2012, emissions increased again, but only slightly (by 1.8 per cent excluding LULUCF and by 3.8 per cent including LULUCF). Emissions between 2000 and 2012 rose by 5.7 per cent excluding LULUCF and by 3.3 per cent including LULUCF. This trend suggests that the structural changes in the economy, which resulted in major emission reductions in the 1990s, may no longer outweigh the impact of economic growth on GHG emissions in EIT Parties.

26. For **non-EIT Parties, GHG emissions excluding LULUCF increased by 1.9 per cent from 1990 to 2012**, while GHG emissions including LULUCF increased by 0.3 per cent over the same period. The increase in emissions was much lower than the economic growth, measured in terms of GDP, of these Parties, which rose by 55.3 per cent from 1990 to 2012 (see table 1). The small increase in emissions over this period indicates that non-EIT Parties are close to returning their emissions to 1990 levels, consistent with Article 4, paragraph 2(b), of the Convention. Between 1990 and 2000, emissions increased significantly (by 9.1 per cent excluding LULUCF and by 9.8 per cent including LULUCF) compared with the change in emissions over the entire period 1990–2012. This was followed by a levelling of emissions and an overall notable emission decrease in the period 2000–2012 (by 6.6 per cent excluding LULUCF and by 8.6 per cent including LULUCF), reflecting the effect of the financial and economic crisis starting in 2008 as well as the relevant PaMs implemented by non-EIT Parties.

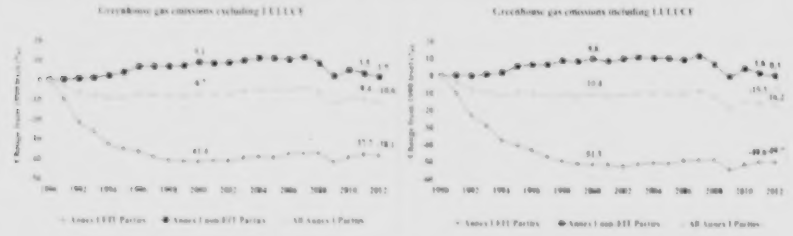
Figure 1
Greenhouse gas emissions of Annex I Parties, 1990, 2000 and 2012



Abbreviations: EIT Parties = Parties with economies in transition, LULUCF = land use, land-use change and forestry, non-EIT Parties = Parties that do not have economies in transition.

Figure 2

Changes in greenhouse gas emissions of Annex I Parties, 1990–2012



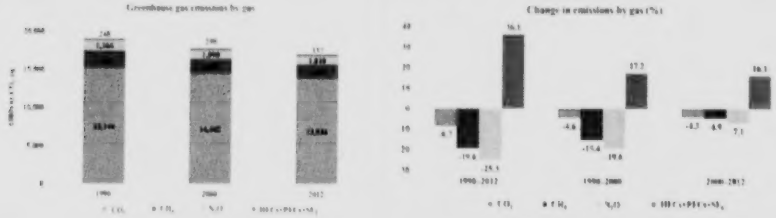
Abbreviations: EIT Parties = Parties with economies in transition, LULUCF = land use, land-use change and forestry, non-EIT Parties = Parties that do not have economies in transition.

C. Greenhouse gas emissions by gas

27. The changes in total emissions (excluding LULUCF) of each GHG in absolute terms and as a percentage change are shown in figure 3. In the three periods discussed in this chapter, **CO_2 emissions decreased (by 8.7 per cent in 1990–2012**, by 4.6 per cent in 1990–2000 and by 4.3 per cent in 2000–2012). Similarly, emissions of methane (CH_4) and nitrous oxide (N_2O) decreased in all time periods, but most of the decrease occurred in the period 1990–2000 (by 15.4 per cent for CH_4 and by 19.6 per cent for N_2O). The decline in emissions could be partly attributed to the PaMs addressing those gases. **Emissions of hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6) taken together increased**, owing mainly to increases in emissions of HFCs used as a substitute for ozone-depleting substances controlled by the Montreal Protocol.

Figure 3

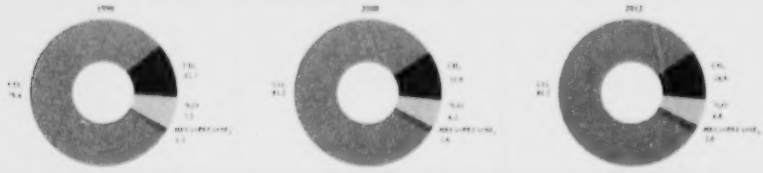
Greenhouse gas emissions of Annex I Parties, by gas



28. The shares of individual gases in the total emissions changed only slightly in the period 1990–2012 (see figure 4). CO_2 continuously accounted for the largest share of total emissions, accounting for 81.1 per cent in 2012 (79.4 per cent in 1990 and 81.2 per cent in 2000), while CH_4 and N_2O contributed 10.9 per cent and 6.0 per cent, respectively, to total emissions in 2012 (12.1 per cent and 7.2 per cent in 1990; and 11.0 per cent and 6.2 per cent in 2000). The sum of HFC, PFC and SF_6 emissions accounted for 1.3 per cent of total emissions in 1990, rising to 2.0 per cent by 2012.

Figure 4

Share of individual greenhouse gases in total emissions excluding land use, land-use change and forestry in 1990, 2000 and 2012 (per cent)



Abbreviations: HFCs = hydrofluorocarbons, PFCs = perfluorocarbons.

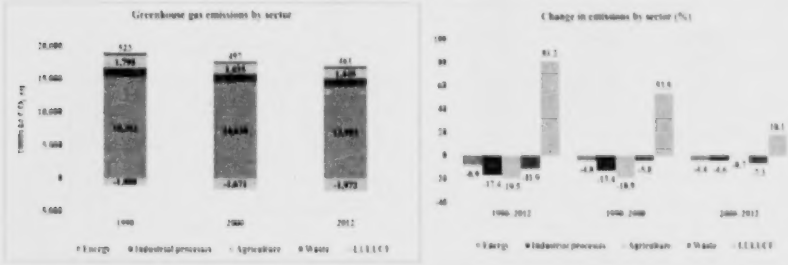
D. Greenhouse gas emissions by sector

29. **Emissions from all sectors decreased between 1990 and 2012** (see figure 5). The greatest decrease occurred in agriculture (–19.5 per cent), which reflects the drop in emissions of CH_4 and N_2O. Nearly all of the decrease in emissions from agriculture occurred in the period 1990–2000 (–18.9 per cent). Emissions from industrial processes underwent the second-largest decrease in the period 1990–2012 (–17.4 per cent), followed by waste (–11.9 per cent) and energy (–8.9 per cent). Net GHG removals from LULUCF increased by 81.2 per cent. From 2000 to 2012, the largest decrease in emissions occurred in the waste sector (–7.3 per cent). Net GHG removals from LULUCF increased by 18.1 per cent over the period 2000 to 2012.

30. Mostly as a result of the global economic crisis that started in 2008, emissions from all sectors decreased compared with in 2007. As economies started to recover in 2010, emissions from the energy and waste sectors continued to decline (by 2.6 and 2.0 per cent, respectively, over the period 2010–2012), while emissions from industrial processes and agriculture increased slightly (by 1.1 and 0.3 per cent, respectively).

Figure 5

Greenhouse gas emissions/removals[a] of Annex I Parties, by sector[b]



Abbreviation: LULUCF = land use, land-use change and forestry.

[a] Figure 5 shows emissions for all sectors, except for LULUCF for which removals are plotted.

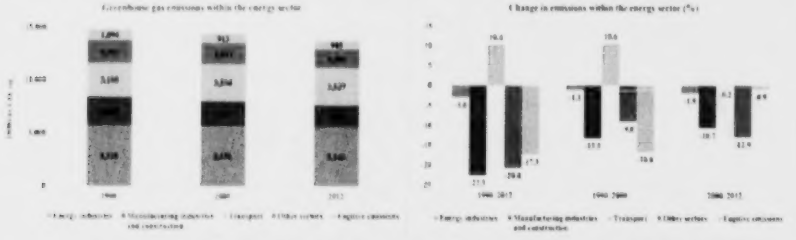
[b] The solvent and other product use sector is not included in the figure because its contribution to total greenhouse gas emissions is very small. Emissions from that sector decreased by 32.9 per cent over the period 1990–2012, by 14.4 per cent from 1990 to 2000 and by 21.6 per cent from 2000 to 2012.

31. The change in the emissions from the energy sector between **1990 and 2012** is the result of changes in the emissions from the energy subsectors (see figure 6). **During that period, emissions from all energy subsectors, except transport, decreased.** Emissions from transport showed a notable increase of 10.4 per cent. A similar trend in emissions can

be observed in the period **from 1990 to 2000, when only emissions from transport increased** (by 10.6 per cent), while emissions from all other activities within the energy sector decreased. Fugitive emissions experienced the largest reduction (–16.6 per cent) in the period 1990–2000. **Between 2000 and 2012, emissions from all energy subsectors decreased**, with other sectors (residential and commercial) experiencing the largest decrease (–12.9 per cent). It is worth noting that emissions from transport continued to rise until 2007, but then declined in 2008 and onward. As a result, emissions from transport in 2012 were slightly lower than in 2000.

Figure 6

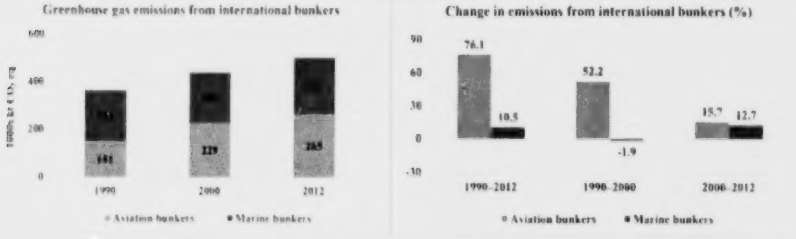
Greenhouse gas emissions of Annex I Parties from the energy sector



32. **In 2012, emissions relating to fuel sold for use in international aviation and marine transport were much higher** (by 76.1 per cent and 10.5 per cent, respectively) than in 1990. Between 1990 and 2000, emissions from aviation increased, whereas emissions from marine transport slightly decreased. During the period 2000–2012, emissions from both international aviation and marine transport increased, by 15.7 per cent and 12.7 per cent, respectively (see figure 7).

Figure 7

Greenhouse gas emissions of Annex I Parties from international bunkers[a]



[a] Emissions from international aviation and marine transport are not included in the national totals of Annex I Parties, but are reported separately.

E. Emission data for individual Annex I Parties

33. Total aggregate GHG emissions excluding and including emissions/removals from LULUCF for each Annex I Party are provided in tables 2 and 3, respectively. Data are provided for 1990, 2000, 2010 and 2012.

34. The changes in the total aggregate GHG emissions over the period 1990–2012 varied considerably across Parties (see figure 8). Emissions excluding LULUCF decreased in 28 Parties and increased in 15 Parties. Romania experienced the largest decrease in emissions excluding LULUCF (–58.3 per cent), followed by Latvia, Ukraine, Lithuania and

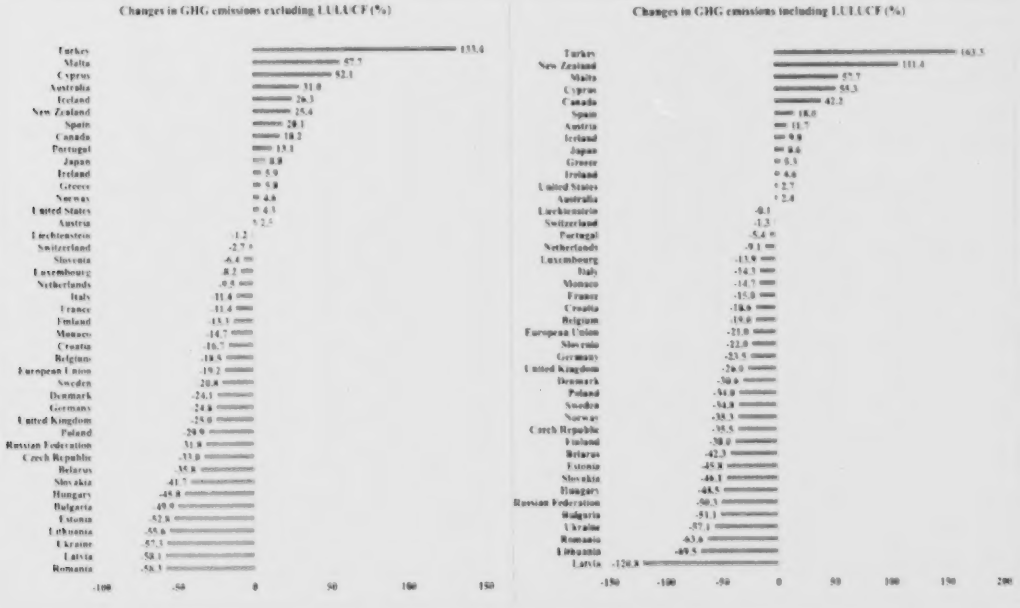
Estonia, with emission reductions of more than 50 per cent. On the other hand, Turkey experienced the greatest increase in emissions excluding LULUCF (133.4 per cent), followed by Malta and Cyprus, whose emissions increased by more than 50 per cent. For emissions including LULUCF, Latvia experienced the largest decrease (–120.8 per cent) and Turkey the highest increase (163.3 per cent). Emissions excluding LULUCF increased by more than 10 per cent in 9 Parties and decreased by more than 10 per cent in 22 Parties. Of those 22 Parties, 13 are EIT Parties and 9 are non-EIT Parties (Belgium, Denmark, Finland, France, Germany, Italy, Monaco, Sweden and United Kingdom). Emissions including LULUCF increased over the period 1990–2012 in 13 Parties and decreased in 30 Parties.

35. In the period 1990–2000, emissions excluding LULUCF decreased in 22 Parties and increased in 21 Parties; emissions including LULUCF decreased in 24 Parties and increased in 19 Parties. In that period, Latvia had the largest emission reductions (–61.9 per cent excluding LULUCF and –164.6 per cent including LULUCF), whereas Turkey had the highest increases (58.2 per cent excluding LULUCF and 71.8 per cent including LULUCF).

36. From 2000 to 2012, total GHG emissions excluding LULUCF decreased in 27 Parties and increased in 16 Parties. Denmark had the largest decrease in emissions excluding LULUCF (–24.1 per cent), followed by Monaco and Belgium, whose emissions decreased by more than 20 per cent. The greatest increase in emissions occurred in Turkey (47.6 per cent), followed by Malta and Luxembourg. Emissions including LULUCF decreased in 25 Parties and increased in 18 Parties.

Figure 8

Changes in total aggregate emissions of individual Annex I Parties, 1990–2012



Source: 2014 national inventory submissions.

Abbreviations: GHG = greenhouse gas, LULUCF = land use, land-use change and forestry.

Table 2

Total aggregate anthropogenic greenhouse gas emissions excluding emissions/removals from land use, land-use change and forestry for 1990, 2000, 2010 and 2012

	kt CO_2 eq				*Change in emissions (%)*		
Party	*1990*[a]	*2000*	*2010*	*2012*	*1990–2012*	*1990–2000*	*2000–2012*
Australia	414 974	489 813	540 211	543 648	31.0	18.0	11.0
Austria	78 086	80 277	84 808	80 059	2.5	2.8	–0.3
Belarus[b]	139 151	79 165	89 426	89 283	–35.8	–43.1	12.8
Belgium	142 952	145 857	130 611	116 520	–18.5	2.0	–20.1
Bulgaria[a, c]	121 880	59 471	60 272	61 046	–49.9	–51.2	2.6
Canada	590 908	721 362	699 302	698 626	18.2	22.1	–3.2
Croatia[a]	31 680	26 339	28 806	26 385	–16.7	–16.9	0.2
Cyprus	6 088	8 904	9 989	9 259	52.1	46.3	4.0
Czech Republic[a]	196 146	146 330	137 008	131 466	–33.0	–25.4	–10.2
Denmark	70 020	69 955	63 007	53 118	–24.1	–0.1	–24.1
Estonia[a]	40 615	17 157	19 892	19 188	–52.8	–57.8	11.8
European Union	5 626 260	5 121 652	4 751 060	4 544 224	–19.2	–9.0	–11.3
Finland	70 329	69 188	74 397	60 966	–13.3	–1.6	–11.9
France	560 384	564 597	522 156	496 221	–11.4	0.8	–12.1
Germany	1 248 049	1 040 367	946 388	939 083	–24.8	–16.6	–9.7
Greece	104 927	126 579	117 878	110 985	5.8	20.6	–12.3
Hungary[a, c]	114 447	76 504	67 638	61 981	–45.8	–33.2	–19.0
Iceland	3 538	3 903	4 646	4 468	26.3	10.3	14.5
Ireland	55 246	68 216	61 895	58 531	5.9	23.5	–14.2
Italy	519 055	551 237	499 359	460 083	–11.4	6.2	–16.5
Japan	1 234 320	1 340 523	1 256 095	1 343 118	8.8	8.6	0.2
Latvia[a]	26 213	9 994	11 987	10 978	–58.1	–61.9	9.9
Liechtenstein	228	251	230	225	–1.2	10.0	–10.2
Lithuania[a]	48 721	19 632	21 119	21 622	–55.6	–59.7	10.1
Luxembourg	12 901	9 762	12 250	11 839	–8.2	–24.3	21.3
Malta	1 992	2 551	2 994	3 140	57.7	28.1	23.1
Monaco	110	122	92	93	–14.7	11.6	–23.5
Netherlands	211 850	213 023	209 286	191 669	–9.5	0.6	–10.0
New Zealand	60 641	70 899	73 491	76 048	25.4	16.9	7.3
Norway	50 409	54 058	54 347	52 733	4.6	7.2	–2.5
Poland[a, c]	569 904	396 104	407 475	399 268	–29.9	–30.5	0.8
Portugal	60 767	84 100	70 634	68 752	13.1	38.4	–18.3
Romania[a, c]	285 048	134 074	115 799	118 764	–58.3	–53.0	–11.4
Russian Federation[a]	3 363 342	2 053 321	2 221 342	2 295 045	–31.8	–38.9	11.8
Slovakia[a]	73 227	48 947	45 382	42 710	–41.7	–33.2	–12.7
Slovenia[a, c]	20 195	18 953	19 411	18 911	–6.4	–6.1	–0.2
Spain	283 749	380 004	347 181	340 809	20.1	33.9	–10.3
Sweden	72 714	68 563	65 072	57 604	–20.8	–5.7	–16.0
Switzerland	52 890	51 775	54 095	51 449	–2.7	–2.1	–0.6
Turkey[b]	188 434	298 091	403 495	439 874	133.4	58.2	47.6
Ukraine[a]	940 175	412 496	385 601	401 019	–57.3	–56.1	–2.8
United Kingdom	778 805	693 693	609 147	584 304	–25.0	–10.9	–15.8
United States	6 219 524	7 075 609	6 854 728	6 487 847	4.3	13.8	–8.3
Number of Parties showing a decrease in emissions by more than 1 per cent					28	21	24
Number of Parties showing a change in emissions within 1 per cent					0	3	6
Number of Parties showing an increase in emissions by more than 1 per cent					15	19	13

[a] A Party undergoing the process of transition to a market economy.

[b] Decision 26/CP.7 invited Parties to recognize the special circumstances of Turkey, which place Turkey in a situation different from that of other Annex I Parties.

[c] Data for the base year under the Convention are for 1990, except for Bulgaria (1988), Hungary (average of 1985–1987), Poland (1988), Romania (1989) and Slovenia (1986), in accordance with decisions 9/CP.2 and 11/CP.4.

Table 3

Total aggregate anthropogenic greenhouse gas emissions including emissions/removals from land use, land-use change and forestry for 1990, 2000, 2010 and 2012

	kt CO_2 eq				*Change in emissions (%)*		
Party	*1990[c]*	*2000*	*2010*	*2012*	*1990–2012*	*1990–2000*	*2000–2012*
Australia	545 495	513 027	568 802	558 809	2.4	–6.0	8.9
Austria	68 209	65 046	80 915	76 221	11.7	–4.6	17.2
Belarus[a]	110 577	48 262	59 247	63 783	–42.3	–56.4	32.2
Belgium	142 118	145 264	129 345	115 139	–19.0	2.2	–20.7
Bulgaria[a, c]	108 093	51 134	52 003	52 838	–51.1	–52.7	3.3
Canada	519 888	669 850	775 045	739 487	42.2	28.8	10.4
Croatia[a]	25 170	18 761	21 801	20 494	–18.6	–25.5	9.2
Cyprus	5 949	8 754	9 931	9 240	55.3	47.1	5.6
Czech Republic[a]	192 708	139 050	131 825	124 214	–35.5	–27.8	–10.7
Denmark	75 303	73 190	62 684	52 281	–30.6	–2.8	–28.6
Estonia[a]	31 794	18 963	15 313	17 237	–45.8	–40.4	–9.1
European Union	5 367 940	4 819 245	4 439 385	4 240 671	–21.0	–10.2	–12.0
Finland	56 654	50 016	50 305	35 113	–38.0	–11.7	–29.8
France	531 764	539 104	485 390	451 967	–15.0	1.4	–16.2
Germany	1 223 531	1 016 400	941 694	935 595	–23.5	–16.9	–8.0
Greece	102 643	124 049	114 973	108 041	5.3	20.9	–12.9
Hungary[a, c]	111 892	75 895	63 699	57 574	–48.5	–32.2	–24.1
Iceland	4 713	4 919	5 437	5 174	9.8	4.4	5.2
Ireland	52 934	67 378	58 037	55 386	4.6	27.3	–17.8
Italy	515 446	534 263	468 239	441 527	–14.3	3.7	–17.4
Japan	1 167 502	1 254 874	1 183 737	1 268 052	8.6	7.5	1.1
Latvia[a]	6 346	-4 097	857	-1 322	–120.8	–164.6	–67.7
Liechtenstein	219	242	223	218	–0.1	10.8	–9.9
Lithuania[a]	44 427	10 245	10 637	13 546	–69.5	–76.9	32.2
Luxembourg	13 249	9 377	11 823	11 405	–13.9	–29.2	21.6
Malta	1 987	2 544	2 987	3 133	57.7	28.1	23.1
Monaco	110	122	92	93	–14.7	11.6	–23.5
Netherlands	214 863	215 395	212 593	195 205	–9.1	0.2	–9.4
New Zealand	23 391	38 549	41 741	49 450	111.4	64.8	28.3
Norway	40 262	30 152	27 577	26 056	–35.3	–25.1	–13.6
Poland[a, c]	556 907	365 504	378 321	367 413	–34.0	–34.4	0.5
Portugal	58 478	74 051	55 402	55 302	–5.4	26.6	–25.3
Romania[a, c]	269 756	108 396	91 209	98 220	–63.6	–59.8	–9.4
Russian Federation[a]	3 527 913	1 646 819	1 654 100	1 753 029	–50.3	–53.3	6.4
Slovakia[a]	64 219	39 193	39 798	34 607	–46.1	–39.0	–11.7
Slovenia[a, c]	18 669	13 600	14 993	14 555	–22.0	–27.1	7.0
Spain	260 444	348 824	313 570	307 280	18.0	33.9	–11.9
Sweden	34 011	26 053	29 934	22 186	–34.8	–23.4	–14.8
Switzerland	50 969	51 787	53 161	50 320	–1.3	1.6	–2.8
Turkey[b]	144 364	248 032	345 647	380 059	163.3	71.8	53.2
Ukraine[a]	870 438	361 665	347 660	373 809	–57.1	–58.5	3.4
United Kingdom	780 684	691 601	601 899	577 326	–26.0	–11.4	–16.5
United States	5 402 124	6 414 839	5 906 734	5 546 304	2.7	18.7	–13.5
Number of Parties showing a decrease in emissions by more than 1 per cent					29	24	25
Number of Parties showing a change in emissions within 1 per cent					1	1	1
Number of Parties showing an increase in emissions by more than 1 per cent					13	18	17

[a] A Party undergoing the process of transition to a market economy.

[a] Decision 26/CP.7 invited Parties to recognize the special circumstances of Turkey, which place Turkey in a situation different from that of other Annex I Parties.

[b] Data for the base year under the Convention are for 1990, except for Bulgaria (1988), Hungary (average of 1985–1987), Poland (1988), Romania (1989) and Slovenia (1986), in accordance with decisions 9/CP.2 and 11/CP.4.

IV. Projections and the total effect of policies and measures

A. Overview

37. This chapter presents **GHG emission projections for 2020 and 2030** for the 41 Annex I Parties that reported such information in their NC6s and BR1s. The EU provided projections in its BR1; however, in accordance with past approaches followed for similar reports, those figures are not included in the totals in this report in order to avoid double counting. At the time of the preparation of this report, Turkey had submitted only its NC5, which did not contain data on GHG emission projections.

38. In accordance with paragraphs 27–48 of the UNFCCC reporting guidelines on NCs, Parties are required at a minimum to report projections under the 'with measures' scenario, but may also report projections under the 'with additional measures' and 'without measures' scenarios. The 'with measures' scenario usually takes into account the effects of PaMs that have been either implemented or adopted. The 'with additional measures' scenario includes the effects of PaMs planned at the time that the projections were prepared. In the 'without measures' scenario, PaMs either implemented, adopted or planned after a year chosen as the starting point for projections are not taken into account.

39. All of the 41 Parties (excluding the EU) that provided information in their NC6s and BR1s reported projections for the 'with measures' scenario; 26 Parties provided projections for the 'with additional measures' scenario; and 12 Parties provided projections for the 'without measures' scenario. For the mandatory 'with measures' scenario, 41 Parties provided quantitative information for 2020, while 35 Parties reported longer-term projections for 2030, as required by the UNFCCC reporting guidelines on BRs. For 2020, projected GHG emissions excluding LULUCF under the 'with measures' scenario were reported by 41 Parties, while 34 Parties reported projections for GHG emissions including LULUCF under the same scenario. For 2030, projected GHG emissions excluding and including LULUCF were reported by 35 and 29 Parties, respectively.

40. Information on the sources of the data used in this chapter and an overview of the scenarios reported by Annex I Parties are provided in table 4.

41. During the period from 1990[13] to 2020, total aggregate GHG emissions excluding LULUCF for Annex I Parties are projected to decrease by 9.7 per cent with the effect of implemented and adopted PaMs. This significant decrease stems from the deep emission cuts made in EIT Parties in the 1990s, resulting in a 35.1 per cent emission decrease for these Parties over the period 1990–2020, which more than offsets the 2.0 per cent projected growth in the emissions of non-EIT Parties over the same period. A similar trend is projected for emissions over the period 1990–2030, with an emission decrease of 7.4 per cent projected for Annex I Parties as a whole. However, compared with in 2010, the emissions in 2020 and 2030 of Annex I Parties are expected to show a small increase (by 0.2 per cent and 2.9 per cent, respectively). This is driven by the continuous small growth

[13] Unless otherwise specified, base year data is used instead of 1990 data. Parties that may use a base year other than 1990, as stipulated in decisions 9/CP.2 and 11/CP.4, provided data for their respective base years. Such Parties and their base years are Bulgaria (1988), Hungary (average of 1985–1987), Poland (1988), Romania (1989) and Slovenia (1986).

in the emissions of EIT Parties since around 2000, following economic recovery, while the emissions of non-EIT Parties are projected to remain broadly stable.

42. It is **estimated that implemented and adopted PaMs will contribute about 3,081 Mt CO_2 eq in avoided annual emissions by 2020**, with almost half of those savings occurring in the energy sector. This estimate suggests that implemented and adopted PaMs will reduce the total aggregate GHG emissions by about 20 per cent by 2020, relative to a 'without measures' scenario.

Table 4
Overview of greenhouse gas emission projection scenarios reported by Annex I Parties in their sixth national communications and first biennial reports

	Scenarios			*Projection*	*GHG emission projections*	
Party	*WM*	*WAM*	*NM*	*period*	*By gas*	*By sector*
Australia	Yes	No	No	to 2030	All 6 gases	All sectors
Austria	Yes	Yes	No	to 2030	All 6 gases	All sectors
Belarus	Yes	No	No	to 2020	All 6 gases	Transport not available
Belgium	Yes	Yes	No	to 2020	All 6 gases	All sectors
Bulgaria	Yes	Yes	No	to 2020	NA	IP and LULUCF not available
Canada	Yes	No	Yes	to 2030	All 6 gases	The categories provided do not follow the common reporting format
Croatia	Yes	Yes	Yes	to 2030	All 6 gases	All sectors
Cyprus	Yes	Yes	Yes	to 2020	All 6 gases	All sectors
Czech Republic	Yes	Yes	No	to 2030	All 6 gases	All sectors
Denmark	Yes	No	No	to 2030	All 6 gases	All sectors
Estonia	Yes	Yes	No	to 2030	All 6 gases	All sectors
European Union	Yes	Yes	No	to 2030	All 6 gases	LULUCF not available
Finland	Yes	Yes	No	to 2030	All 6 gases	All sectors
France	Yes	Yes	Yes	to 2020	All 6 gases	Transport not available
Germany	Yes	No	No	to 2030	All 6 gases	Transport and LULUCF not available
Greece	Yes	Yes	No	to 2030	All 6 gases	All sectors
Hungary	Yes	Yes	No	to 2030	All 6 gases	All sectors
Iceland	Yes	No	No	to 2030	All 6 gases	LULUCF not available
Ireland	Yes	Yes	No	to 2030	All 6 gases	LULUCF not available
Italy	Yes	Yes	No	to 2030	All 6 gases	All sectors
Japan	Yes	No	No	to 2020	All 6 gases	NA
Latvia	Yes	Yes	No	to 2030	All 6 gases	All sectors
Liechtenstein	Yes	No	No	to 2030	All 6 gases	All sectors
Lithuania	Yes	Yes	Yes	to 2030	All 6 gases	All sectors
Luxembourg	Yes	Yes	No	to 2030	All 6 gases	LULUCF not available
Malta	Yes	Yes	Yes	to 2030	All 6 gases	All sectors
Monaco	Yes	No	No	to 2030	All 6 gases	Transport and agriculture not available
Netherlands	Yes	Yes	No	to 2030	All 6 gases	All sectors
New Zealand	Yes	No	Yes	to 2030	All 6 gases	All sectors
Norway	Yes	No	No	to 2030	All 6 gases	All sectors
Poland	Yes	No	No	to 2030	All 6 gases	All sectors
Portugal	Yes	No	No	to 2030	All 6 gases	All sectors
Romania	Yes	Yes	Yes	to 2030	All 6 gases	All sectors
Russian Federation	Yes	Yes	Yes	to 2030	All 6 gases	Only energy available

Party	Scenarios			Projection period	GHG emission projections	
	WM	WAM	NM		By gas	By sector
Slovakia	Yes	Yes	No	to 2030	All 6 gases	All sectors
Slovenia	Yes	Yes	No	to 2030	All 6 gases	All sectors
Spain	Yes	Yes	Yes	to 2030	All 6 gases	All sectors
Sweden	Yes	Yes	No	to 2030	All 6 gases	All sectors
Switzerland	Yes	Yes	Yes	to 2030	All 6 gases	All sectors
Turkey	No	No	No	NA	NA	NA
Ukraine	Yes	Yes	Yes	to 2030	All 6 gases	All sectors
United Kingdom	Yes	No	No	to 2030	All 6 gases	All sectors
United States	Yes	No	No	to 2030	All 6 gases	All sectors

Note: The information for Turkey is from its fifth national communication, as Turkey has not yet submitted its sixth national communication.

Abbreviations: GHG = greenhouse gas, IP = industrial processes, LULUCF = land use, land-use change and forestry, NA = not available, NM = without measures, WAM = with additional measures, WM = with measures.

B. Methods and assumptions used to prepare projections

43. The models used by Parties to estimate projections can be broadly classified into three categories: models for projecting energy-related GHG emissions; models for projecting non energy related GHG emissions; and models for projecting GHG emissions and removals from LULUCF. Most Parties (except Croatia, Cyprus and Iceland) provided a detailed explanation of the models and approaches used to project energy-related emissions, as required by the UNFCCC reporting guidelines on NCs. Most Parties also provided explanations of how emissions and removals were projected for the non-energy sectors, but they were usually less detailed than for energy-related emissions.

44. Most Parties used an integrated approach for projecting energy-related emissions, whereby macroeconomic top-down models were coupled with sector- and technology-specific bottom-up models. However, the type and characteristics of the models differed among Parties.

45. Almost all Parties used spreadsheet models to project emissions from non-energy sources other than LULUCF, which were based on activity data, emission factors and sector-specific growth assumptions. For the projections of GHG emissions and removals from LULUCF, Parties used models broadly consistent with those used for their GHG inventories, together with sector-specific assumptions.

46. All Parties reported on the assumptions used in preparing their emission projections. The three key drivers of GHG emissions for most Parties are GDP and population growth and the international oil price (see table 5). Additional assumptions used by Parties concerned the expected development of GDP components, the international prices of coal and gas, the level of electricity production and consumption, heating and cooling degree days, and activity data for some emission drivers such as industrial production, number of livestock and number of households.

47. The comparison of the projected emission trends across Parties, and their aggregation, should be undertaken with caution for the following reasons:

(a) The diversity in the use of models and approaches among Parties for making the projections;

(b) The differences among Parties in the use of key assumptions, to which the projected emissions are highly sensitive.

Table 5
Summary of key assumptions used in preparing greenhouse gas emission projections

	2011–2020	*2020–2030*
Average gross domestic product growth rate (per year)		
Below 2%	Austria, Belarus, France, Germany, Greece, Hungary, Ireland, Italy, Japan, Malta, Netherlands, Portugal, Spain, Switzerland and United Kingdom	Austria, Canada, Czech Republic, Denmark, Germany, Greece, Ireland, Italy, Malta, Netherlands, Norway, Sweden and Switzerland
2–4%	Australia, Canada, Croatia, Czech Republic, Denmark, Estonia, Iceland, New Zealand, Norway, Romania, Russian Federation, Slovakia, Slovenia, Sweden and United States	Australia, Croatia, Estonia, Iceland, Latvia, New Zealand, Portugal, Romania, Russian Federation, Slovakia, Slovenia, Spain, United Kingdom and United States
Above 4%	Latvia	
Not available	Belgium, Bulgaria, Cyprus, Finland, Liechtenstein, Lithuania, Luxembourg, Monaco, Poland and Ukraine	Belarus, Belgium, Bulgaria, Cyprus, Finland, France, Hungary, Japan, Liechtenstein, Lithuania, Luxembourg, Monaco, Poland and Ukraine
Average population growth rate (per year)		
Below zero (negative)	Belarus, Bulgaria, Croatia, Estonia, Germany, Hungary, Japan, Latvia, Romania, Slovakia and Spain	Bulgaria, Croatia, Estonia, Germany, Latvia, Lithuania, Romania, Russian Federation, Slovakia and Slovenia
0–2%	Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Greece, Iceland, Ireland, Italy, Liechtenstein, Lithuania, Luxembourg, Malta, Monaco, Netherlands, New Zealand, Norway, Portugal, Russian Federation, Slovenia, Sweden, Switzerland, United Kingdom and United States	Australia, Austria, Canada, Czech Republic, Denmark, Finland, Greece, Iceland, Ireland, Italy, Liechtenstein, Luxembourg, Malta, Monaco, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom and United States
Not available	Cyprus, Poland and Ukraine	Belarus, Belgium, Cyprus, France, Hungary, Japan, Poland and Ukraine
International oil price (per barrel)		
< USD 75	Latvia and Portugal	Latvia and Portugal
> USD 75	Austria, Bulgaria, Canada, Croatia, Czech Republic, Denmark, Estonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Netherlands, New Zealand, Norway, Romania, Slovakia, Slovenia and Switzerland	Austria, Bulgaria, Canada, Croatia, Czech Republic, Denmark, Estonia, Germany, Greece, Iceland, Ireland, Italy, Netherlands, New Zealand, Norway, Romania, Slovakia, Slovenia, Sweden and Switzerland
Not available	Australia, Belarus, Belgium, Cyprus, Finland, Japan, Liechtenstein, Lithuania, Luxembourg, Malta, Monaco, Poland, Russian Federation, Spain, Sweden, Ukraine, United Kingdom and United States	Australia, Belarus, Belgium, Cyprus, Finland, France, Hungary, Japan, Liechtenstein, Lithuania, Luxembourg, Malta, Monaco, Poland, Russian Federation, Spain, Ukraine, United Kingdom and United States

C. Projected total aggregate greenhouse gas emissions

48. This section deals with the projections of total[14] GHG emissions for Annex I countries as a whole, excluding and including LULUCF, for 2020 and 2030, reported for the 'with measures', 'with additional measures' and 'without measures' scenarios.

49. Varying numbers of Parties reported projections for each of the three scenarios and for the years 2020 and 2030, but all Parties reported information under the 'with measures' scenario for 2020. In order to have a comparable set of data allowing for a rough comparison of the total GHG emissions of all Parties in 2020 and 2030, the following approaches were used: (a) where projection estimates were missing for 2030 under both the 'with measures' and 'with additional measures' scenarios, data reported for 2020 were assumed to remain the same for 2030; and (b) where the 'with additional measures' scenario was not reported, data for the 'with measures' scenario were used for both 2020 and 2030.

1. Projections excluding emissions/removals from land use, land-use change and forestry

Projections under the 'with measures' scenario

50. All 41 Annex I Parties provided projections under the 'with measures' scenario for 2020, while 6 Parties (Belarus, Belgium, Bulgaria, Cyprus, France and Japan) did not report projections for 2030.

51. Figure 9 shows the total projected GHG emissions excluding LULUCF in 2020 and 2030. Total GHG emissions are projected to decrease from 18,876 Mt CO_2 eq in 1990 to 17,036 Mt CO_2 eq in 2020, or by 9.7 per cent. This result differs sharply from the projections reported in the NC5s,[15] where emissions were reported to be expected to increase (by 0.6 per cent) over the same period. Total GHG emissions in 2030 are projected to be 7.4 per cent below the 1990 level, because between 2020 and 2030 emissions are projected to increase by 2.6 per cent. Compared with in 2010, GHG emissions in 2020 are projected to have increased by 0.2 per cent, while emissions in 2030 are projected to be 2.9 per cent higher than in 2010 (see paras. 52–53 below).

52. The GHG emissions of **EIT** Parties are projected to decrease significantly over the periods 1990–2020 and 1990–2030 (by 35.1 per cent and 30.1 per cent, respectively). However, this overall decrease masks a **projected increase in emissions for this group of Parties, by 6.7 per cent by 2020 and by 14.9 per cent by 2030, compared with the 2010** level. The projected changes in the total GHG emissions of EIT Parties are consistent with the historical trends for the period 1990–2012: deep emission reductions were experienced in the period 1990–2000 as a result of the transition to a market economy and the economic restructuring in those countries and a decline in economic output. However, as most of their economies grew during the period 2000–2012, their emissions also began to increase, although at a slow rate, and this increase is projected to continue until 2030.

53. For **non-EIT Parties**, modest growth in emissions is projected for both periods 1990–2020 (by 2.0 per cent) and 1990–2030 (by 3.1 per cent). Compared with in 2020, emissions in 2030 are projected to have increased slightly, by 1.1 per cent. On the other hand, **emissions in both 2020 and 2030 are projected to have decreased slightly compared with in 2010 (by 1.5 per cent and 0.4 per cent, respectively)**, which to some extent can be attributed to the effect of PaMs in the countries. Although the emissions of non-EIT Parties will continue to account for the largest share of the total aggregate GHG emissions of Annex I Parties in 2020 (77.3 per cent of the total), this share is expected to

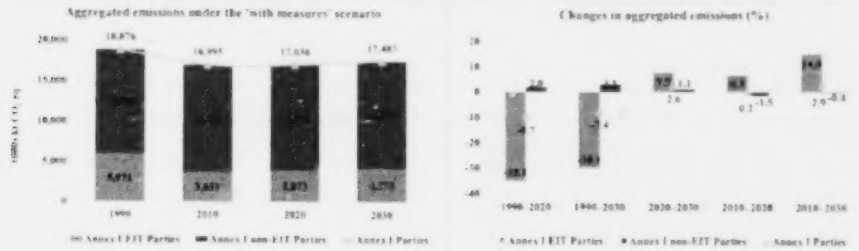
[14] As Turkey did not provide projections in its NC5, the figures for total GHG emissions cover only the 41 Annex I Parties that reported such data.

[15] See document FCCC/SBI/2011/INF.1/Add.1, chapter IV.

become somewhat smaller by 2030 (76.1 per cent of the total). This is due to the expected continued increase in the emissions of EIT Parties, while the emissions of non-EIT Parties are expected to remain broadly stable.

Figure 9

Projected greenhouse gas emissions excluding land use, land-use change and forestry in 2020 and 2030 under the 'with measures' scenario



Abbreviations: EIT Parties = Parties with economies in transition, non-EIT Parties = Parties that do not have economies in transition

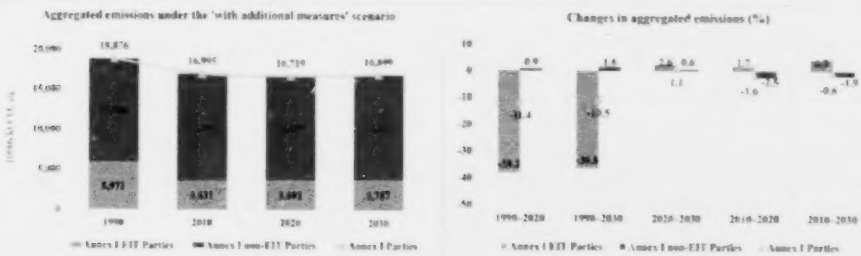
Projections under the 'with additional measures' scenario

54. **Projections under the 'with additional measures' scenario were provided by 26 Parties**, and in many cases the reason for reporting that scenario was for Parties to plan further measures to achieve their commitments under the Convention. All of those Parties provided projections for 2020; while Belgium, Bulgaria, Cyprus and France did not provide projections for 2030. The Parties that provided projections for 2020 account for only 27.6 per cent of the total emissions excluding LULUCF of Annex I Parties in 1990.

55. Using the approach described in paragraph 49 above, total GHG emissions are projected to decrease from 18,876 Mt CO_2 eq in 1990 to 16,720 Mt CO_2 eq in 2020, or by 11.4 per cent (see figure 10). Emissions are also projected to decrease over the period 1990–2030, but by a slightly smaller amount (10.5 per cent). Compared with in 2010, a decrease in emissions is also projected by 2020 (−1.6 per cent) and 2030 (−0.6 per cent). Emissions during the period 2020–2030 are projected to increase by 1.1 per cent.

Figure 10

Projected greenhouse gas emissions excluding land use, land-use change and forestry in 2020 and 2030 under the 'with additional measures' scenario



Abbreviations: EIT Parties = Parties with economies in transition, non-EIT Parties = Parties that do not have economies in transition

Projections under the 'without measures' scenario

56. Twelve Parties (Canada, Croatia, Cyprus, France, Lithuania, Malta, New Zealand, Romania, Russian Federation, Spain, Switzerland and Ukraine) reported projections under

the 'without measures' scenario for 2020, of which 3 Parties (Canada, Cyprus and France) did not report data for 2030.

57. For that group of Parties, GHG emissions excluding LULUCF are projected to decrease by 7.7 per cent, from 6,226 Mt CO_2 eq to 5,746 Mt CO_2 eq, during the period 1990–2020. In comparison with the 'with measures' scenario, implemented and/or adopted PaMs are estimated to lower emissions by 2020 by 954 Mt CO_2 eq, or by 16.6 per cent. These figures cover only the 12 Parties referred to in paragraph 56 above and should therefore be interpreted with caution.

2. Projections including emissions/removals from land use, land-use change and forestry

58. Of the 41 Parties that have submitted their BR1s and NC6s (in addition to the EU), **34 Parties reported projections of total GHG emissions including LULUCF under the 'with measures' scenario for 2020**. For 2030, five of those Parties (Australia, Belarus, Belgium, Cyprus and France) did not provide such information (for those Parties, the approach described in paragraph 49 above was used).

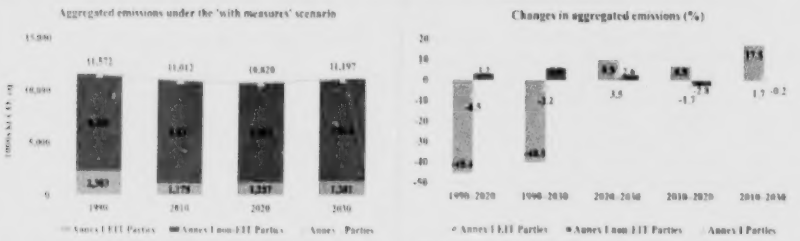
59. For those 34 Parties taken together, total GHG emissions including LULUCF are projected to amount to 10,820 Mt CO_2 eq in 2020, representing a reduction of 6.5 per cent compared with the 1990 level (11,572 Mt CO_2 eq). Between 2020 and 2030, emissions are projected to increase by 3.5 per cent, resulting in an overall 3.2 per cent decrease in emissions over the period 1990–2030. Compared with in 2010, emission reductions are projected to occur by 2020 (−1.7 per cent), whereas growth in emissions is expected by 2030 (1.7 per cent). Figure 11 shows the projected GHG emissions including LULUCF in 2020 and 2030.

60. For comparison, the total GHG emissions excluding LULUCF for the same group of 34 Parties are projected to amount to 12,146 Mt CO_2 eq in 2020, representing a reduction of 4.2 per cent compared with the 1990 level (12,680 Mt CO_2 eq). Emissions excluding LULUCF are projected to be 1.1 per cent lower in 2030 (12,535 Mt CO_2 eq) than in 1990. From 2020 to 2030, emissions excluding LULUCF for this group are projected to increase by 3.2 per cent. These figures show that the trends in projected emissions excluding LULUCF are similar to those including LULUCF.

61. While the projections for 2020 for GHG emissions excluding LULUCF cover 41 Parties, the projections for GHG emissions including LULUCF cover only 34 Parties. Therefore, the difference in the projected emission trends between figures 9 and 11 should be interpreted with caution.

Figure 11

Projected greenhouse gas emissions including land use, land-use change and forestry in 2020 and 2030 under the 'with measures' scenario (34 Parties)



Abbreviations: EIT Parties = Parties with economies in transition, non-EIT Parties = Parties that do not have economies in transition.

D. Greenhouse gas emission projections by sector

1. Projected changes in sectoral greenhouse gas emissions under the 'with measures' scenario

62. **All Annex I Parties except Japan provided projection data by sector for 2020**, whereas 35 Parties reported sectoral data for 2030. Belarus, Belgium, Bulgaria, Cyprus, France and Japan did not provide a sectoral breakdown of projected emissions for 2030 and are therefore not included in the sectoral assessment for that year. Canada reported projections categorized by its own economic sectors; for the purpose of this report, those sectors were associated with the sectors defined in the common tabular format (CTF) tables.[16] The Russian Federation reported only emissions for the energy sector (excluding transport) separately from the total emissions for both 2020 and 2030. Furthermore, projections were not available for all sectors for all 35 Parties. Hence, sector-specific calculations are based on available data by sector, and differences among sectors in terms of percentage changes in the projected emissions for 2020 and 2030 relative to the 1990 and 2010 levels should be interpreted with caution.

63. For all Parties taken together, the energy sector (including transport) is projected to continue being the dominant source of GHG emissions in 2020, contributing 83.3 per cent of total GHG emissions. GHG emissions from the energy sector comprise two distinct sources that exhibit almost the same trends: **emissions excluding transport are projected to decrease by 10.0 per cent**, from 11,303 Mt CO_2 eq in 1990 to 10,170 Mt CO_2 eq in 2020, and **emissions from the transport sector are also projected to decrease, by 9.6 per cent**, from 2,979 Mt CO_2 eq to 2,694 Mt CO_2 eq. **These trends contrast with the projections provided in the NC5s**, in which emissions from the energy sector were projected to increase by 0.4 per cent. This contrast is particularly visible **over the period 2010–2020, where a 19.6 per cent drop in emissions from the transport sector is now projected at the same time as 3.1 per cent growth in emissions from energy excluding transport.** Figure 12 presents the emission projections for 2020 under the 'with measures' scenario, by sector.

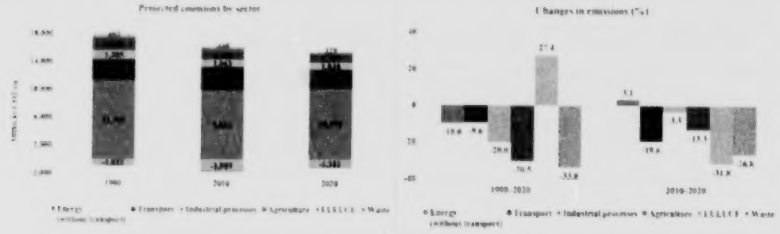
64. **Emissions from all non-energy sectors are projected to decrease** over the periods 1990–2020 and 2010–2020, in general relatively more than emissions from the energy sector. Net removals from the LULUCF sector are projected to increase by 27.4 per cent between 1990 and 2020, but decrease by 31.8 per cent from 2010 to 2020.

65. Considering the total emissions of the 35 Parties that reported sectoral projections for 2030, it is expected that the energy sector will remain the dominant source of GHG emissions. GHG emissions from 1990 to 2030 from all sectors are projected to decrease, while net removals from the LULUCF sector are projected to increase (by 38.2 per cent). Compared with emissions in 2010, the projected emissions for 2030 show a different trend: emissions from energy (excluding transport) and industrial process are projected to increase (by 8.2 per cent and 14.3 per cent, respectively), while emissions from the other sectors are projected to decrease. Figure 13 shows the emission projections for 2030 under the 'with measures' scenario, by sector.

[16] Canada reported projection data for the following economic sectors: transport, emission-intensive trade-exposed industries, oil and gas, electricity, buildings, waste and other, and agriculture. For this report, emission-intensive trade-exposed industries, oil and gas, electricity and buildings were associated with the stationary part of the energy sector.

Figure 12

Projected greenhouse gas emissions/removals under the 'with measures' scenario, by sector, in 2020 (40 Parties)

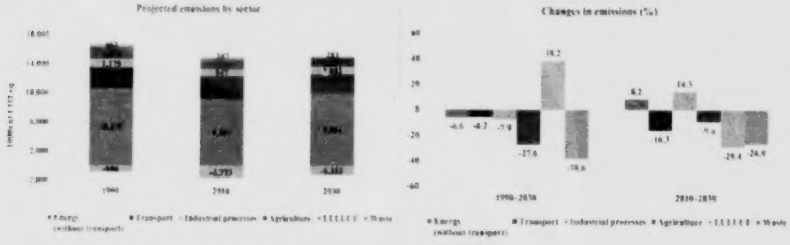


Note: Because of the difference in the number of Parties covered, the figures presented for emissions for individual sectors may not necessarily be consistent with the national totals given elsewhere in this document.

Abbreviation: LULUCF = land use, land-use change and forestry.

Figure 13

Projected greenhouse gas emissions/removals under the 'with measures' scenario, by sector, in 2030 (35 Parties)



Note: Because of the difference in the number of Parties covered, the figures presented for emissions for individual sectors may not be necessarily consistent with the national totals given elsewhere in this document.

Abbreviation: LULUCF = land use, land-use change and forestry.

66. The larger projected decrease in emissions in the period 1990–2020 compared with in the period 1990–2030 is consistent with the projections of total aggregated emissions described in chapter IV.C above, but it may also be due in part to the difference in the number of Parties covered in the totals. In particular, the Parties that did not report a sectoral breakdown of projected emissions for 2030 (those five Parties account for almost 5 per cent of the total emissions in 2020) are expected to experience significant emission reductions between 1990 and 2020.

2. Projected changes in greenhouse gas emissions from international bunker fuels

67. A total of eight Parties (EU, Greece, Iceland, Portugal, Slovakia, Slovenia, Sweden and United Kingdom) reported projections of GHG emissions from international bunker fuels, which is fewer Parties than those that reported such information in their NC5s (14 Parties). All eight Parties provided projected emissions from international aviation, but only three of them (EU, Iceland and United Kingdom) reported projections for marine transport as well.

68. Using the data provided by the EU and Iceland, total GHG emissions from fuel use for international aviation are projected to more than double between 1990 and 2020, from

70 Mt CO_2 eq in 1990 to 140 Mt CO_2 eq in 2020. From 1990 to 2030, the projected increase in these emissions is even higher (134.1 per cent). However, GHG emissions from international aviation are projected to increase by 16.9 per cent between 2020 and 2030. These values cover a very limited set of Parties and therefore may not be representative of the sector.

E. Total effect of policies and measures of Annex I Parties

69. This section addresses the estimated and expected total effect of implemented and adopted PaMs as well as the total effect of planned PaMs.

70. According to the UNFCCC reporting guidelines on NCs, Parties are required to present the estimated and expected total effect of implemented and adopted PaMs in the form of GHG emissions sequestered or avoided for certain years, including 2020 and 2030. Parties may calculate the total effect of their measures by doing either of the following:

(a) Taking the difference between the GHG emissions under the 'with measures' and 'without measures' projections, if projections under the 'without measures' scenario were provided;

(b) Aggregating the effects of individual PaMs that have been implemented and/or adopted.

71. Similarly, the estimated and expected total effect of planned PaMs is calculated by either taking the difference between the GHG emissions under the 'with additional measures' and 'with measures' projections, if available, or by summing up the effects of individual planned PaMs. It should be noted that aggregating the effects of individual PaMs generally produces an overestimate of the total effect of PaMs because of interactions between measures. For example, PaMs that improve energy efficiency will have smaller effects when combined with PaMs that reduce the carbon intensity of energy use.

72. The Russian Federation is the only Party that did not report the effects of individual implemented and/or adopted PaMs expected in 2020 and is hence not included in this analysis.

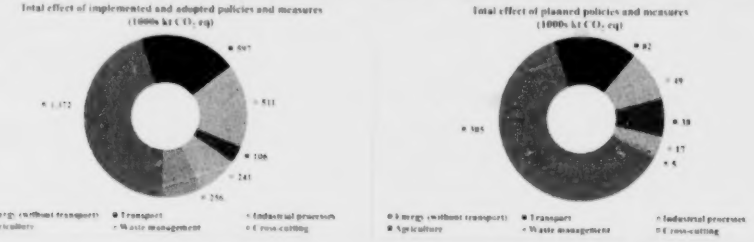
73. The sum of Annex I Parties' expected total effects of PaMs implemented and/or adopted is 3,084 Mt CO_2 eq avoided annual emissions by 2020. Almost half of those emission savings (44.5 per cent) are projected to occur in the energy sector. Transport-related PaMs are expected to deliver savings of 597 Mt CO_2 eq (or 19.4 per cent of the total savings), while PaMs in the industrial processes sector account for 16.6 per cent of the expected emission savings. PaMs in the remaining sectors are expected to result in 20 per cent of the total emission savings.

74. Twenty-five Parties plan to implement additional measures by 2020, which are expected to lead to further emission savings (avoided annual emissions) of 496 Mt CO_2 eq. The majority of those savings (61.6 per cent) will occur in the energy sector, followed by the transport sector (16.6 per cent).

75. The total estimated and expected effects of PaMs implemented and/or adopted ('with measures') and planned ('with additional measures') in 2020 are shown in figure 14.

Figure 14

Estimated and expected effects of implemented and/or adopted ('with measures') and planned ('with additional measures') policies and measures of Annex I Parties in 2020[a]



[a] Does not include the Russian Federation.

F. Projection data for individual Annex I Parties

76. Projected percentage changes in GHG emissions for individual Annex I Parties by 2020 compared with the 1990 level under the 'with measures' scenario are provided in figure 15. This information, along with projected absolute emission levels, is presented in tabular format in tables 6 and 7, with the inclusion of the data reported under the 'with additional measures' and 'without measures' scenarios, where available.

77. The projected total GHG emissions of Annex I Parties in 2020 are influenced mainly by the emissions of Australia, Canada, Germany, Japan, Russian Federation and United States, which account for about 75 per cent of the total emissions of Annex I Parties expected under the 'with measures' scenario. Some of the key aspects of their projected GHG emission profiles are as follows:

(a) Australia's GHG emissions are projected to increase from 415 Mt CO_2 eq in 1990 to 595 Mt CO_2 eq in 2020 (a 43.3 per cent increase) and to decrease to 589 Mt CO_2 eq in 2030;

(b) Canada's GHG emissions are projected to increase from 591 Mt CO_2 eq in 1990 to 762 Mt CO_2 eq in 2020 (a 29.0 per cent increase) and to 815 Mt CO_2 eq in 2030;

(c) A decline in Germany's GHG emissions is projected between 1990 and 2020 (−32.9 per cent), from 1,248 Mt CO_2 eq to 837 Mt CO_2 eq, with a further decrease by 2030 to 718 Mt CO_2 eq (−14.2 per cent);

(d) For Japan's GHG emissions by 2020, an increase of 10.5 per cent is projected, from 1,234 Mt CO_2 eq in 1990 to 1,364 Mt CO_2 eq in 2020. Japan did not provide projection estimates for 2030;

(e) The GHG emissions of the Russian Federation are projected to decrease from 3,363 Mt CO_2 eq to 2,400 Mt CO_2 eq between 1990 and 2020 (a 28.6 per cent reduction), but increase by 2030 compared with in 2020 (by 7.9 per cent), resulting in an overall projected decline in emissions in the period 1990–2030 of 23.0 per cent;

(f) The United States has projected its GHG emissions to grow from 6,220 Mt CO_2 eq in 1990 to 6,787 Mt CO_2 eq in 2020 (an increase of 9.1 per cent) and then to 7,005 Mt CO_2 eq by 2030 (an overall increase of 12.6 per cent over the period 1990–2030).[17]

[17] Compared with those in 2005, the GHG emissions of the United States are projected to decrease by 6.1 per cent by 2020 and by 3.1 per cent by 2030.

78. The individual projected changes in total aggregate GHG emissions varied considerably among Parties:[18]

(a) For the reported projection estimates under the 'with measures' scenario for the period 1990–2020:

(i) Out of the 41 Parties that provided such information for GHG emissions excluding LULUCF, Estonia showed the largest emission decrease (−58.0 per cent), followed by Romania, Ukraine and Bulgaria with decreases exceeding 50 per cent, while, at the other extreme, Australia showed an emission increase of 43.3 per cent, followed by Spain with an increase of 36.7 per cent;

(ii) Out of the 34 Parties that provided such information for GHG emissions including LULUCF, Latvia showed the largest decrease (−171.4 per cent) in GHG emissions including LULUCF, while New Zealand showed the highest emissions increase (221.0 per cent);

(b) For the reported projection estimates under the 'with measures' scenario for the period 1990–2030:

(i) Out of the 35 Parties that provided such information for GHG emissions excluding LULUCF, values for the change ranged from a decrease of 60.2 per cent (Estonia) to an increase of 61.9 per cent (Spain);

(ii) Out of the 29 Parties that provided such information for GHG emissions including LULUCF, values for the change ranged from –60.5 per cent (Latvia) to +262.9 per cent (New Zealand);

(c) For the reported projection estimates under the 'with additional measures' scenario for the period 1990–2020:

(i) Out of the 26 Parties that provided such information for GHG emissions excluding LULUCF, Estonia showed the largest emission decrease (−59.3 per cent), followed by Lithuania and Bulgaria, whereas only Spain and Ireland showed emission increases (33.5 per cent and 5.0 per cent, respectively);

(ii) Out of the 22 Parties that provided such information for GHG emissions including LULUCF, Latvia showed the largest emission decrease (−192.8 per cent), while Spain showed the highest emission increase (34.3 per cent);

(d) For the reported projection estimates under the 'with additional measures' scenario for the period 1990–2030:

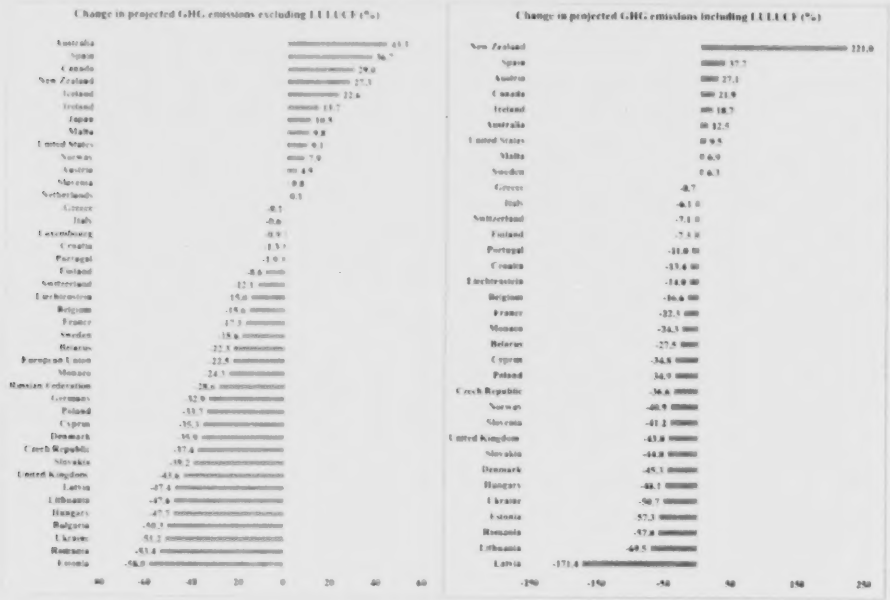
(i) Out of the 22 Parties that provided such information for GHG emissions excluding LULUCF, the individual projected changes ranged from a 61.1 per cent decrease (Estonia) to increases of 56.7 per cent (Spain) and 1.7 per cent (Ireland);

(ii) Out of the 19 Parties that provided such information for GHG emissions including LULUCF, the individual projected changes ranged from decreases of 96.8 per cent (Latvia) and 77.4 per cent (Lithuania) to an increase of 59.7 per cent (Spain).

[18] The count of Annex I Parties that have reported this information excludes the European Union.

Figure 15

Projected changes in the total aggregate greenhouse gas emissions of individual Annex I Parties under the 'with measures' scenario by 2020 compared with the 1990 level



Abbreviations: GHG = greenhouse gas, LULUCF = land use, land-use change and forestry.

Table 6

Projected changes in the total aggregate greenhouse gas emissions excluding emissions/removals from land use, land-use change and forestry of individual Annex I Parties

		'With measures' scenario				*'With additional measures' scenario*				*'Without measures' scenario*			
	Actual emissions (kt CO_2 eq)	*Projected emissions (kt CO_2 eq)*		*Change compared with in 1990 (%)*		*Projected emissions (kt CO_2 eq)*		*Change compared with in 1990 (%)*		*Projected emissions (kt CO_2 eq)*		*Change compared with in 1990 (%)*	
Party	*1990*	*2020*	*2030*	*2020*	*2030*	*2020*	*2030*	*2020*	*2030*	*2020*	*2030*	*2020*	*2030*
Australia	414 974	594 773	589 197	43.3	42.0	–	–	–	–	–	–	–	–
Austria	78 086	81 636	84 034	4.5	7.6	77 502	78 064	–0.7	0.0	–	–	–	–
Belarus	139 151	108 079	–	–22.3	–	–	–	–	–	–	–	–	–
Belgium	142 952	120 625	–	–15.6	–	118 760	–	–16.9	–	–	–	–	–
Bulgaria	121 880	60 604	–	–50.3	–	54 108	–	–55.6	–	–	–	–	–
Canada	590 908	762 000	815 000	29.0	37.9	–	–	–	–	862 400	–	45.94	–
Croatia	31 680	31 270	31 599	–1.3	–0.3	31 270	26 173	–1.3	–17.4	39 002	46 781	23.11	47.67
Cyprus	6 088	3 937	–	–35.3	–	3 458	–	–43.2	–	6 939	–	13.99	–
Czech Republic	196 146	122 697	109 646	–37.4	–44.1	120 844	106 801	–38.4	–45.6	–	–	–	–
Denmark	70 020	44 898	44 822	–35.9	–36.0	–	–	–	–	–	–	–	–
Estonia	40 615	17 060	16 165	–58.0	–60.2	16 550	15 797	–59.3	–61.1	–	–	–	–
European Union	5 626 260	4 359 151	4 238 897	–22.5	–24.7	4 156 344	3 922 351	–26.1	–30.3	–	–	–	–
Finland	70 329	64 292	50 632	–8.6	–28.0	62 322	45 362	–11.4	–35.5	–	–	–	–
France	560 384	463 650	–	–17.3	–	426 730	–	–23.9	–	688 790	–	22.91	–
Germany	1 248 049	837 000	718 000	–32.9	–42.5	–	–	–	–	–	–	–	–
Greece	104 927	104 852	100 184	–0.1	–4.5	103 876	94 899	–1.0	–9.6	–	–	–	–
Hungary	114 447	59 840	58 598	–47.7	–48.8	56 774	55 400	–50.4	–51.6	–	–	–	–
Iceland	3 538	4 338	4 314	22.6	21.9	–	–	–	–	–	–	–	–
Ireland	55 246	62 833	67 058	13.7	21.4	57 997	56 170	5.0	1.7	–	–	–	–
Italy	519 055	516 079	523 903	–0.6	0.9	455 037	430 977	–12.3	–17.0	–	–	–	–
Japan	1 234 320	1 364 000	–	10.5	–	–	–	–	–	–	–	–	–
Latvia	26 213	13 800	16 034	–47.4	–38.8	13 134	15 145	–49.9	–42.2	–	–	–	–
Liechtenstein	228	194	177	–15.0	–22.5	–	–	–	–	–	–	–	–
Lithuania	48 721	25 533	30 248	–47.6	–37.9	21 294	22 527	–56.3	–53.8	34 344	39 059	–29.51	–19.83

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		'With measures' scenario				'With additional measures' scenario				'Without measures' scenario			
	Actual emissions ($kt\ CO_2\ eq$)	Projected emissions ($kt\ CO_2\ eq$)		Change compared with in 1990 (%)		Projected emissions ($kt\ CO_2\ eq$)		Change compared with in 1990 (%)		Projected emissions ($kt\ CO_2\ eq$)		Change compared with in 1990 (%)	
Party	1990	2020	2030	2020	2030	2020	2030	2020	2030	2020	2030	2020	2030
Luxembourg	12 901	12 786	13 864	–0.9	7.5	12 054	12 868	–6.6	–0.3	–	–	–	–
Malta	1 992	2 186	2 325	9.8	16.7	1 736	1 795	–12.9	–9.9	3 902	4 643	95.91	133.12
Monaco	110	83	76	–24.3	–30.9	–	–	–	–	–	–	–	–
Netherlands	211 850	211 974	197 878	0.1	–6.6	202 834	184 639	–4.3	–12.8	–	–	–	–
New Zealand	60 641	77 218	82 244	27.3	35.6	–	–	–	–	77 778	82 852	28.26	36.63
Norway	50 409	54 400	52 200	7.9	3.6	–	–	–	–	–	–	–	–
Poland	569 904	377 655	398 565	–33.7	–30.1	–	–	–	–	–	–	–	–
Portugal	60 767	59 632	53 327	–1.9	–12.2	–	–	–	–	–	–	–	–
Romania	285 048	132 911	147 457	–53.4	–48.3	129 892	143 891	–54.4	–49.5	140 510	160 194	–50.71	–43.80
Russian Federation	3 263 342	2 400 000	2 590 000	–28.6	–23.0	2 250 000	2 260 000	–33.1	–32.8	2 860 000	3 490 000	–14.97	3.77
Slovakia	73 227	44 492	45 291	–39.2	–38.1	42 295	42 941	–42.2	–41.4	–	–	–	–
Slovenia	20 195	20 351	19 087	0.8	–5.5	18 650	17 388	–7.6	–13.9	–	–	–	–
Spain	283 749	387 834	459 326	36.7	61.9	378 906	444 652	33.5	56.7	472 592	583 706	66.55	105.71
Sweden	72 714	59 155	57 328	–18.6	–21.2	58 735	56 958	–19.2	–21.7	–	–	–	–
Switzerland	52 890	46 491	39 826	–12.1	–24.7	42 781	31 014	–19.1	–41.4	50 503	47 978	–4.51	–9.29
Ukraine	940 175	459 104	541 981	–51.2	–42.4	451 777	520 462	–51.9	–44.6	–	–	–	–
United Kingdom	778 805	438 897	397 071	–43.6	–49.0	–	–	–	–	509 641	800 097	–45.79	–14.90
United States	6 219 524	6 787 000	7 005 000	9.1	12.6	–	–	–	–	–	–	–	–

Table 7

Projected changes in the total aggregate greenhouse gas emissions including emissions/removals from land use, land-use change and forestry of individual Annex I Parties

		'With measures' scenario				*'With additional measures' scenario*				*'Without measures' scenario*			
	Actual emissions (kt CO_2 eq)	*Projected emissions (kt CO_2 eq)*		*Change compared with in 1990 (%)*		*Projected emissions (kt CO_2 eq)*		*Change compared with in 1990 (%)*		*Projected emissions (kt CO_2 eq)*		*Change compared with in 1990 (%)*	
Party	*1990*	*2020*	*2030*	*2020*	*2030*	*2020*	*2030*	*2020*	*2030*	*2020*	*2030*	*2020*	*2030*
Australia	545 495	613 536	–	12.5	–	–	–	–	–	–	–	–	–
Austria	68 209	86 667	89 065	27.1	30.6	82 533	83 095	21.0	21.8	–	–	–	–
Belarus	110 577	80 199	–	–27.5	–	–	–	–	–	–	–	–	–
Belgium	142 118	118 512	–	–16.6	–	118 760	–	–16.4	–	–	–	–	–
Bulgaria	108 093	–	–	–	–	–	–	–	–	–	–	–	–
Canada	519 888	634 000	673 000	21.9	29.5	–	–	–	–	–	–	–	–
Croatia	25 170	21 797	22 675	–13.4	–9.9	20 532	15 663	–18.4	–37.8	31 348	39 020	24.55	55.03
Cyprus	5 949	3 879	–	–34.8	–	3 400	–	–42.8	–	6 881	–	15.67	–
Czech Republic	192 708	122 167	107 533	–36.6	–44.2	120 622	105 210	–37.4	–45.4	–	–	–	–
Denmark	75 303	41 226	41 296	–45.3	–45.2	–	–	–	–	–	–	–	–
Estonia	31 794	13 588	12 976	–57.3	–59.2	13 077	12 608	–58.9	–60.3	–	–	–	–
European Union	5 367 940	–	–	–	–	–	–	–	–	–	–	–	–
Finland	56 654	52 492	38 732	–7.3	–31.6	50 422	33 462	–11.0	–40.9	–	–	–	–
France	531 764	413 400	–	–22.3	–	376 480	–	–29.2	–	638 540	–	20.08	–
Germany	1 223 531	–	–	–	–	–	–	–	–	–	–	–	–
Greece	102 643	101 876	97 570	–0.7	–4.9	100 900	92 285	–1.7	–10.1	–	–	–	–
Hungary	111 892	58 046	56 391	–48.1	–49.6	54 981	53 193	–50.9	–52.5	–	–	–	–
Iceland	4 713	–	–	–	–	–	–	–	–	–	–	–	–
Ireland	52 934	62 833	67 058	18.7	26.7	57 997	56 170	9.6	6.1	–	–	–	–
Italy	515 446	483 993	494 355	–6.1	–4.1	422 951	401 430	–17.9	–22.1	–	–	–	–
Japan	1 167 502	–	–	–	–	–	–	–	–	–	–	–	–
Latvia	6 346	–4 533	2 508	–171.4	–60.5	–5 892	201	–192.8	–96.8	–	–	–	–
Liechtenstein	219	188	172	–14.0	–21.4	–	–	–	–	–	–	–	–

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		'With measures' scenario				'With additional measures' scenario				'Without measures' scenario			
	Actual emissions ($kt\ CO_2\ eq$)	Projected emissions ($kt\ CO_2\ eq$)		Change compared with in 1990 (%)		Projected emissions ($kt\ CO_2\ eq$)		Change compared with in 1990 (%)		Projected emissions ($kt\ CO_2\ eq$)		Change compared with in 1990 (%)	
Party	1990	2020	2030	2020	2030	2020	2030	2020	2030	2020	2030	2020	2030
Lithuania	44 427	13 533	17 748	–69.5	–60.1	9 294	10 027	–79.1	–77.4	22 344	26 559	–49.71	–40.22
Luxembourg	13 249	–	–	–	–	–	–	–	–	–	–	–	–
Malta	1 987	2 123	2 261	6.9	13.8	1 672	1 731	–15.8	–12.9	3 843	4 585	93.46	130.77
Monaco	110	83	76	–24.3	–30.9	–	–	–	–	–	–	–	–
Netherlands	214 863	–	–	–	–	–	–	–	–	–	–	–	–
New Zealand	23 391	75 078	84 892	221.0	262.9	–	–	–	–	85 010	88 820	263.43	279.72
Norway	40 262	23 800	25 700	–40.9	–36.2	–	–	–	–	–	–	–	–
Poland	556 907	362 458	390 644	–34.9	–29.9	–	–	–	–	–	–	–	–
Portugal	58 478	52 058	45 004	–11.0	–23.0	–	–	–	–	–	–	–	–
Romania	269 756	113 718	138 329	–57.8	–48.7	112 036	136 577	–58.5	–49.4	112 482	141 321	–58.30	–47.61
Russian Federation	3 527 913	–	–	–	–	–	–	–	–	–	–	–	–
Slovakia	64 219	35 463	35 103	–44.8	–45.3	32 912	32 520	–48.7	–49.4	–	–	–	–
Slovenia	18 669	10 971	9 960	–41.2	–46.6	9 270	8 261	–50.3	–55.7	–	–	–	–
Spain	260 444	358 660	430 536	37.7	65.3	349 733	415 862	34.3	59.7	445 753	557 664	71.15	114.12
Sweden	34 011	36 142.30	33 447.01	6.3	–1.7	35 722	33 077	5.0	–2.7	–	–	–	–
Switzerland	50 969	47 352	40 637	–7.1	–20.3	44 592	33 375	–12.5	–34.5	49 714	46 689	–2.46	–8.40
Ukraine	870 438	429 331	506 781	–50.7	–41.8	422 004	485 260	–51.5	–44.3	509 641	800 097	–41.45	–8.08
United Kingdom	780 684	438 467	399 233	–43.8	–48.9	–	–	–	–	–	–	–	–
United States	5 402 124	5 917 000	6 104 000	9.5	13.0	–	–	–	–	–	–	–	–

V. Quantified economy-wide emission reduction targets and progress in their achievement

A. Summary of targets

79. Annex I Parties have to report in their biennial reports (BRs) information describing their quantified economy-wide emission reduction targets (hereinafter referred to as targets), including any conditions or assumptions that are relevant to the attainment of those targets, as communicated to the secretariat and contained in document FCCC/SB/2011/INF.1/Rev.1 or any update to that document.[19] Each Annex I Party also has to report on the progress made in the achievement of its target.

80. All Annex I Parties, except Turkey, have pledged targets as agreed in the Copenhagen Accord. Each target is stipulated as a percentage reduction in absolute emissions from the base year level to be achieved by 2020. For example, the EU has pledged to achieve an emission level by 2020 that is 20 per cent below its emission level in 1990. The base year for expressing the targets is 2005 for Canada, Japan and United States, 2000 for Australia and 1990 for all other Parties.

81. Some Parties have taken on multiple targets: one that is unconditional (or independent of forthcoming circumstances) and others that are conditional (or contingent upon certain conditions, such as treaty provisions or pledges made by other Parties). Examples of the provisions tied to the conditional targets are: achieving a comprehensive global agreement, with the participation of all major economies; all Parties contributing their fair share to a cost-effective global emission reduction pathway; and an effective set of rules for LULUCF and the use of market-based mechanisms.

82. Some Parties have also established long-term targets or objectives for the post-2020 time-horizon, typically for 2050. Table 8 shows Parties' emission reduction targets, the base years, the conditionality status of their 2020 targets, and their post-2020 targets. Table 10 presents additional details on the accounting aspects of the targets.

Table 8
Annex I Parties' greenhouse gas emission reduction targets

Party	*Reported GHG emission reduction targets for 2020 (reduction from base year emission level)*	*GHG emission reduction long-term targets or objectives (reduction from base year emission level)*
Australia	5% (unconditional); 15% (conditional); 25% (conditional) relative to 2000	80% by 2050 relative to 2000
Belarus	5–25% (conditional) relative to 1990	
Canada	17% (conditional) relative to 2005	
European Union and its 28 member States	20% (unconditional); 30% (conditional) relative to 1990	Finland and Germany: 80–95% United Kingdom: 80% by 2050 relative to 1990
Iceland	20% (unconditional); 30% (conditional) relative to 1990[a]	

[19] The latest update is contained in document FCCC/SBSTA/2014/INF.6.

Party	*Reported GHG emission reduction targets for 2020 (reduction from base year emission level)*	*GHG emission reduction long-term targets or objectives (reduction from base year emission level)*
Japan	3.8% relative to 2005	
Kazakhstan	5% (unconditional) relative to 1990	
Liechtenstein	20% (unconditional), 30% (conditional) relative to 1990	
Monaco	20% (unconditional), 30% (conditional) relative to 1990	Carbon neutral by 2050
New Zealand	5% (unconditional), 10–20% (conditional) relative to 1990	
Norway	30% (unconditional), 40% (conditional) relative to 1990	Carbon neutral by 2050 (unconditional) or by 2030 (conditional)
Russian Federation	15–25% (conditional) relative to 1990	
Switzerland	20% (unconditional), 30% (conditional) relative to 1990	
Turkey	No reported target	
Ukraine	20% (conditional) relative to 1990	
United States of America	17% (conditional) relative to 2005	

[a] To be fulfilled jointly with the European Union and its 28 member States.

83. The **unconditional emission reduction targets for 2020** – taken on by Australia, EU, Iceland, Japan, Kazakhstan, Liechtenstein, Monaco, New Zealand, Norway and Switzerland – range from 3.8 per cent below the 2005 emission level (Japan) to 30 per cent below the 1990 emission level (Norway). The **conditional emission reduction targets for 2020** – taken on by all Parties, except Japan and Kazakhstan – range from 5 per cent below the 1990 emission level (Belarus) to 40 per cent below the 1990 emission level (Norway). When a Party submitted two targets, unconditional and conditional, it aimed at increasing the ambition of its target under certain circumstances.

84. Some Parties (Australia, Finland, Germany, Monaco, Norway and United Kingdom) have indicated targets for the post-2020 time frame that may require greater effort. These **longer-term targets are typically emission reductions of about 80 per cent below the base year emission level by 2050**. Monaco and Norway have indicated a long-term goal to become carbon neutral by 2050 or earlier.

85. Under the Convention, the EU has taken on a quantified economy-wide emission reduction target for 2020 jointly with all of its member States. Details on the implementation of this joint target, which is unique under the UNFCCC, are provided in the 2008 EU climate and energy package. The package stipulates that the target will be met by the EU and its member States through a 21 per cent reduction, from the 2005 level, in GHG emissions from installations under the European Union Emissions Trading System (EU ETS) and a 10 per cent reduction, from the 2005 level, in GHG emissions from the sectors not covered by the EU ETS (non-ETS sectors) (primarily transport and some industrial

processes, agriculture and waste).[20] For emissions covered by the EU ETS, the common EU-wide target applies to all member States as a group; for emissions outside of the EU ETS, the EU effort-sharing decision provides targets for each member State individually to reduce or limit growth in its GHG emissions between 2005 and 2020. **Thus, at present, the EU member States do not have individual emission reduction targets for their total emissions under the UNFCCC.** Table 9 provides an overview of the targets for the non-ETS sectors, under the EU effort-sharing decision, of the EU member States.

86. In addition to the EU emission reduction targets for the EU ETS and the non-ETS sectors, some Parties reported additional national targets for 2020 or beyond, which are underpinned by national legislation and regulations. These include: a 40 per cent emission reduction by 2020 compared with in 1990 for Denmark; a reduction of at least 80 per cent by 2050 relative to 1990 for Finland; a 40 per cent reduction by 2020 and a 80–95 per cent reduction by 2050 relative to 1990 for Germany; and a reduction of at least 80 per cent by 2050 relative to 1990 for the United Kingdom.

Table 9

Greenhouse gas emission reduction targets of the European Union's 28 member States for the sectors not covered by the European Union Emissions Trading System

Party	*Greenhouse gas emission reduction target by 2020 compared with in 2005*	*Party*	*Greenhouse gas emission reduction target by 2020 compared with in 2005*	*Party*	*Greenhouse gas emission reduction target by 2020 compared with in 2005*
Austria	–16%	Germany	–14%	Netherlands	–16%
Belgium	–15%	Greece	–4%	Poland	14%
Bulgaria	20%	Hungary	10%	Portugal	1%
Croatia	11%	Ireland	–20%	Romania	19%
Cyprus	–5%	Italy	–13%	Slovakia	13%
Czech Republic	9%	Latvia	17%	Slovenia	4%
Denmark	–20%	Lithuania	15%	Spain	–10%
Estonia	11%	Luxembourg	–20%	Sweden	–17%
Finland	–16%	Malta	5%	United Kingdom	–16%
France	–14%				

87. Table 10 presents a more detailed view of the **accounting aspects of Parties' targets**. The commonly cited base year (see para. 80 above and table 8) is the reference for measuring CO_2, CH_4 and N_2O emissions towards meeting Parties' targets. For many Parties, the base year for fluorinated gases (F-gases) (HFCs, PFCs and SF_6) is the same as for the other gases (CO_2, CH_4 and N_2O), but for Belarus and Kazakhstan they differ. On gas coverage, all Parties include emissions of CO_2, CH_4, N_2O, HFCs, PFCs and SF_6 in their

[20] The European Union's emissions in 2005 (5,129 Mt CO_2 eq) were below those in 1990 (5,574 Mt CO_2 eq), so the combined 21 per cent EU ETS reduction and 10 per cent non EU ETS reduction from 2005 are sufficient to achieve a 20 per cent overall emission reduction from 1990.

targets; while all but Canada, Kazakhstan, Liechtenstein and Ukraine also include nitrogen trifluoride (NF_3) emissions in their targets, but many have yet to determine their base year for that gas.

88. Parties use different global warming potential (GWP) values to calculate their targets and the progress made towards meeting them. Some Parties use the values contained in the Second Assessment Report of the Intergovernmental Panel on Climate Change (IPCC), while others use those from the IPCC Fourth Assessment Report, but the EU and Japan seem to use a mixture of the two.

89. On the sectoral coverage of the targets, all Parties include in their targets:

(a) Emissions from the energy, transport, industrial processes, agriculture and waste sectors; while the EU target also includes emissions from aviation included in the EU ETS and emissions from other sources (common reporting format category 7);

(b) Emissions and removals from LULUCF, except for Belarus and EU, but they vary in their accounting approaches: some use the activity-based approach to LULUCF accounting; others use the land-based approach.

90. Parties vary in whether they account for the use of market-based mechanisms (i.e. acquired certified emission reductions (CERs), emission reduction units (ERUs), assigned amount units (AAUs), carry-over units under the Kyoto Protocol and units from other mechanisms under the Convention) in achieving their targets. The EU explicitly allows the use of market-based mechanisms when accounting for the progress made towards its targets, while the Russian Federation and Ukraine explicitly disallow their use. However, it has been noted elsewhere that "with few exceptions, Parties stated their intention to make use of carbon credits in achieving their targets".[21]

91. Overall, Annex I Parties use various approaches when accounting for the progress made towards their targets under the Convention. In contrast, the approaches used for accounting towards the achievement of the commitments inscribed in Annex B to the Kyoto Protocol are based on agreed rules for the GWP values and the treatment of emissions and removals from the LULUCF sector. In addition, there are also agreed rules for the use of AAUs and carbon credits, for example from joint implementation (JI) and the clean development mechanism (CDM).

[21] See document FCCC/TP/2014/8.

Table 10
Reported assumptions regarding Annex I Parties' quantified economy-wide emission reduction targets

Party	*Emission reduction target (change from base year level)*	*Base year (CO_2, CH_4 and N_2O)*	*Base year (HFCs, PFCs and SF_6)*	*Base year (NF_3)*	*Gases (CO_2, CH_4, N_2O, HFCs, PFCs and SF_6)*	*Gases (other)*	*Global warming potential values used*	*Sectors (energy, transport, industrial processes, agriculture and waste)*	*Sectors (LULUCF included)*	*LULUCF accounting approach used*	*Market-based mechanisms under the Convention used*
Australia	–5%	2000	2000	2000	All	NF_3	AR2	All	Yes	Activity	
Belarus	–12%	1990	1995	1995	All	NF_3	AR2	All	No		
Canada	–17%	2005	2005		All		AR2	All	Yes	Other[c]	
European Union (28)	–20%	1990	1990	To be determined	All[a]	NF_3	AR4/AR2	All[b]	No		Yes
Iceland	–20%	1990	1990	To be determined	All	NF_3	AR4	All	Yes	Activity	
Japan	–3.8%	2005	2005	2005	All	NF_3	AR4/AR2	All	Yes	Activity	
Kazakhstan	–5%	1990	1995		All		AR2	All	Yes		
Liechtenstein	–20%	1990	1990		All		AR2	All	Yes	Land	
Monaco	–30%	1990	1990	To be determined	All	NF_3	AR4	All	Yes	Land	
New Zealand	–5%	1990	1990	1990	All	NF_3	AR4	All	Yes	Activity	
Norway	–30%	1990	1990	to be determined	All	NF_3	AR4	All	Yes	Activity	
Russian Federation	–25%	1990	1990	1990	All	NF_3	AR4	All	Yes	Other	No
Switzerland	–20%	1990	1990	1990	All	NF_3	AR4	All	Yes	Activity	
Turkey	–	–	–	–	–	–	–	–	–	–	–
Ukraine	–20%	1990	1990		All		AR2	All	Yes	Land	No
United States	–17%	2005	2005	2005	All	NF_3	AR4	All	Yes	Land	

Abbreviations: AR2 = Second Assessment Report of the Intergovernmental Panel on Climate Change, AR4 = Fourth Assessment Report of the Intergovernmental Panel on Climate Change, LULUCF = land use, land-use change and forestry.

[a] There is also a limit on the total fluorinated gases (HFCs + PFCs + SF_6).

[b] In addition, the European Union's target includes aviation under the European Union Emissions Trading System and other (common reporting format category table 7).

[c] Based on LULUCF reporting categories under the Convention; difference between 2005 and 2020 for cropland remaining cropland, forest land converted to other land and other land converted to forest land, reference level from Durban agreement (decision 12/CP.17) for forest land remaining forest land.

B. Progress in achieving the quantified economy-wide emission reduction targets

92. In their BR1s, all Parties reported information on their mitigation actions implemented to achieve their targets. A number of Parties also reported on their plans to use units from market-based mechanisms and LULUCF to achieve their targets. To report that information, most Parties completed CTF tables 3 and 4 and many Parties also provided a textual description in their BR1. Parties also reported on their domestic institutional arrangements, including implementation strategies, governance and accountability (see chapter VI below).

93. **Annex I Parties have implemented mitigation actions that target all relevant sectors and GHGs.** To achieve their 2020 targets, Parties strengthened their PaMs, building on the policy infrastructure set up so far for the implementation of the Convention and its Kyoto Protocol. The effects of these PaMs are reflected in the past and future emission trends. However, as emission reductions can be the result of technological improvements, behavioural changes and economic and demographic shifts – some induced by PaMs, others not – it is **very difficult to separate the effects of PaMs from the effects of other key drivers** (see chapters III and IV above). The **mitigation actions with the most significant reported effects are economic, fiscal and regulatory policies** aimed at energy and transport, but some voluntary and information policies also show great effects.

94. Regarding the progress made towards achieving their quantified economy-wide emission reduction targets, **total GHG emissions (without LULUCF) in 2011 were below the base year emission level for most Parties** and for some Parties also below the calculated target year emission level (see paras. 101–102 below).

95. A number of Parties reported their plan to use market-based mechanisms and some Parties reported some preliminary assessment on how LULUCF can contribute to the progress made towards achieving their targets (see paras. 101–102 below). However, this information is very preliminary and in some cases incomplete. Hence, it is **not possible at this point of time to outline any general trends in terms of the contribution of LULUCF and the use of market-based mechanisms to the achievement of the targets**.

96. By 2020, the avoided emissions resulting from the implemented and adopted mitigation actions of all Annex I Parties are estimated to equal 3,107 Mt CO_2 eq and Parties estimate a saving of 88 Mt CO_2 eq to be achieved through planned mitigation actions.[22] Thus, avoided emission due to mitigation actions are expected by most Parties to contribute significantly to their expected emission reductions by 2020.

1. Mitigation actions and their effects

97. Tables 11 and 12 show the number of reported mitigation actions, their implementation status and their estimated mitigation effects by 2020 in Annex I Parties and within the EU. **In total, 1,375 mitigation actions were reported, including 1,037 by the EU member States**. Three quarters of those actions, accounting for 87 per cent of the total estimated mitigation impact, have already been implemented. Some 13 per cent of the PaMs, accounting for 10 per cent of the total estimated mitigation impact, have been adopted, but not yet implemented. About a quarter of the PaMs, accounting for 13 per cent of the estimated mitigation impact by 2020, have implementation start dates in 2011 or later, which corresponds to the NC6 reporting period. For about half of the reported

[22] These figures do not include the estimated mitigation impact of the 73 PaMs reported by the EU, in order to avoid the double counting of the estimated mitigation effects reported by its 28 member States.

mitigation actions, estimates of their mitigation effect (i.e. avoided emissions or emission reductions) have been provided. The **sum of individual Annex I Parties' estimated effect of the mitigation actions by 2020 is 3,195 Mt CO_2 eq**.[23]

Table 11
Reported mitigation actions of Annex I Parties

Party	*Total number of mitigation actions reported*	*Number of mitigation actions reported as implemented/adopted/planned*	*Number of mitigation actions reported with quantified effects*	*Estimated avoided emissions in 2020 due to mitigation actions reported with quantified effects (kt CO_2 eq)*
Australia	6	6/0/0	6	175 600
Belarus	16	16/0/0	3	25 010
Canada	90	77/4/9	30	104 288
European Union	73	57/11/5	30	2 846 150
28 European Union member States[a]	1 037	735/171/131	533	869 088
Iceland	16	16/0/0	5	328
Japan	39	39/0/0	5	48 960
Kazakhstan	–	0/0/0	–	–
Liechtenstein	4	3/0/1	3	12
Monaco	20	17/0/3	3	14
New Zealand	20	20/0/0	4	11 732
Norway	13	12/1/0	4	1 120
Russian Federation	–	0/0/0	–	–
Switzerland	42	38/0/4	18	1 005
Turkey	–	0/0/0	–	–
Ukraine	3	0/3/0	3	69 120
United States	69	61/2/6	40	1 888 530
Total for Annex I Parties[b]	**1 375**	**1040/181/154**	**657**	**3 194 806**

[a] While the European Union reported on common European Union policies and measures (PaMs), European Union member States reported also national PaMs and made national estimates of the effect of their PaMs (see table 12).

[b] These figures do not include the mitigation actions and their estimated effects reported by the European Union, in order to avoid the double counting of the mitigation actions and estimated effects reported by its 28 member States.

[23] This result differs somewhat from the estimated total effect of PaMs reported in paragraph 73 above. The difference likely arises from the fact that some Parties calculate the total effect of their PaMs by taking the difference between the 'with measures' and 'without measures' scenarios, rather than by aggregating the effects of individual PaMs.

Table 12
Reported mitigation actions of European Union member States

Party	*Total number of mitigation actions reported*	*Number of mitigation actions reported as implemented/adopted/planned*	*Number of mitigation actions reported with quantified effects*	*Estimated avoided emission by 2020 due to mitigation actions reported with quantified effects (kt CO2 eq)*
Austria	23	19/4/0	8	6
Belgium	112	105/1/6	28	27 988
Bulgaria	21	2/10/9	18	9 053
Croatia	44	31/0/13	2	685
Cyprus	17	16/0/1	17	2 986
Czech Republic	47	37/2/8	38	20 137
Denmark	52	52/0/0	5	2 443
Estonia	15	13/0/2	14	3 716
Finland	41	32/2/7	24	36 457
France	10	10/0/0	9	50 410
Germany	35	25/10/0	24	70 952
Greece	25	18/0/7	22	41 033
Hungary	31	21/8/2	22	23 238
Ireland	47	29/2/16	47	10 841
Italy	44	24/0/20	44	117 060
Latvia	35	26/5/4	11	1 511
Lithuania	9	9/0/0	9	10 491
Luxembourg	20	16/0/4	2	723
Malta	52	29/14/9	31	3 302
Netherlands	17	17/0/0	16	105 800
Poland	39	38/0/1	–	–
Portugal	47	31/3/13	10	2 698
Romania	22	21/0/1	22	49 868
Slovakia	26	13/13/0	26	8 047
Slovenia	32	28/2/2	24	20 376
Spain	93	1/86/6	31	109 215
Sweden	33	33/0/0	3	3 100
United Kingdom	48	39/9/0	26	136 951
Total for European Union member States	**1 037**	**735/171/131**	**533**	**869 088**

2. Estimates of emission reductions and removals and the use of units from market-based mechanisms and land use, land-use change and forestry activities

98. To report on the progress made in achieving their quantified economy-wide emission reduction targets, **most Parties (except Belarus, Bulgaria, Cyprus, Ireland, Kazakhstan, Slovenia and United States) completed CTF table 4**. The reported

information was complete for most Parties; however, some **accuracy and consistency issues** can be identified in the tables. These issues are most probably due to the fact that this was the first time that Parties reported information in this format. The **following issues were noted**:[24]

(a) Total emissions excluding LULUCF were not reported by eight Parties, which are all EU member States, of which three used the notation key for not applicable. This is most likely because the EU as a whole, but not the individual member States, communicated a target under the Convention. Another reason is that those Parties do not have national targets for their total emissions, as outlined in paragraph 85 above. Thus, table 13 reflects the information provided on the progress made towards the target for the EU and its 28 member States as a whole and not for the single member States;

(b) A contribution from LULUCF was reported by the EU and 13 of its member States, although the unconditional target of a 20 per cent emission reduction by 2020 compared with in 1990, which is referred to by all EU member States, excludes LULUCF;

(c) Regarding the quantity of units used from market-based mechanisms, several Parties reported values that do not necessarily correspond with the amount of units that they intend to use to achieve their targets. For some of those Parties, the reported use of units far exceeds the estimated total emissions, which is probably caused by the reporting of their AAUs pursuant to Article 3, paragraphs 7 and 8, of the Kyoto Protocol.[25]

99. The individual reviews of the NC6s and BR1s provided more detailed information on the progress made by individual Parties towards achieving their 2020 targets and thus the corresponding review reports can be used as an additional source of information. However, at the time of the preparation of this report, reviews were still in progress and only 17 out of 44 review reports had been published.[26]

100. The reported information on emission levels in BR CTF table 4 is summarized in table 13. For Belarus, Kazakhstan and United States, the relevant information from CTF table 1 was used. Modifications to the originally reported data are explained in the footnotes to the table. The target year (2020) emissions were calculated by multiplying the emission level in the base year, and the contribution of LULUCF if applicable, by the percentage change from the base year to the target given in table 10. It has to be noted that the calculated values for the target year emissions are only indicative values based on the GHG emission and removal estimates reported in the BR1s, which may change whenever a Party recalculates its GHG emissions and removals for the base year.

101. The information presented in table 13 shows that most Parties, for 2011, reported estimates of GHG emissions that are between the estimated base year and target year emissions. A few Parties, namely EIT Parties and the EU, reported estimated emissions for 2011 that are below the target emission level and four Parties, namely Australia, Iceland, New Zealand and Norway, reported estimated emissions for 2011 that are above the base year emission level. However, progress made towards achieving their targets can be identified also for those Parties: for Australia and New Zealand by considering the contribution of LULUCF, and for Norway by considering the quantity of units used from market-based mechanisms in 2011.

[24] Many of these reporting issues were fixed during the expert reviews of the BR1s, as reflected in the BR CTF tables, resubmitted by some Parties.

[25] The contributions of mechanisms under the Convention and its Kyoto Protocol to the progress made towards the targets depends on the acquired, not distributed or sold, CERs, ERUs, AAUs, carry-over units and units from other mechanisms.

[26] The review reports of individual Parties' BR1s are available at <http://unfccc.int/national_reports/biennial_reports_and_iar/technical_reviews/items/8446.php>.

102. As shown in table 13, for most Parties the achieved emission reduction from the base year to 2011 contributes most to the progress made towards achieving their targets. For some Parties, namely Australia, Japan, New Zealand and Russian Federation, the contribution of LULUCF also has a significant effect on progress, whereas for Ukraine and United States the contribution of LULUCF has a negative effect on progress made in 2011. As reported for 2011, units from market-based mechanisms play a role in only two Parties' progress towards achieving their targets, namely EU and Norway.

Table 13

Progress made by Annex I Parties in the achievement of their emission reduction targets – emission levels, contribution of land use, land-use change and forestry and carbon credits from market-based mechanisms

Party	*Emissions in the base year (kt CO_2 eq)*	*LULUCF contribution in the base year (kt CO_2 eq)*	*Emissions in 2011 (kt CO_2 eq)*	*LULUCF contribution in 2011 (kt CO_2 eq)*	*Carbon credits from market-based mechanisms in 2011 (kt CO_2 eq)*	*Calculated target year (2020) emissions (kt CO_2 eq)[a]*
Australia	493 272	71 320	552 286	10 854	0	536 362
Belarus[b]	139 151	0	87 320	0	0	122 453
Canada	737 000	0	702 000	–9 097	0	611 710
European Union (and its 28 member States)	5 791 122	0	4 578 469	0[c]	211 200[d]	4 632 898
Iceland	3 508	0	4 413	–337[c]	0	2 806
Japan	1 351 407	0	1 307 728	52 188	0	1 300 053
Kazakhstan[b]	358 378	0	274 461	0	0	340 459
Liechtenstein	230	–9	222	–7	0	177
Monaco	108	–0.01	85	–0.02	0	76
New Zealand	59 643	0	72 835	–16 877	0	56 661
Norway	50 453	0	53 446	0	19 333	35 317
Russian Federation	3 351 944	84 514	2 320 834	–628 435	0[c]	2 577 344
Switzerland	52 790	0	50 149	–2 722	0	42 232
Turkey	–	–	–	–	–	–
Ukraine	929 894	–69 737	401 576	–7 290	0	688 125
United States[a]	7 169 899	–972 468	6 665 701	–868 416	0	5 143 868

Abbreviation: LULUCF = land use, land-use change and forestry.

[a] Target year (2020) emissions are indicative only and calculated by multiplying the estimated emissions in the base year, and the estimated contribution of LULUCF in the base year if applicable, by the percentage change in the estimated emissions from the base year to the target, as contained in table 10.

[b] Information from common tabular format (CTF) table 1.

[c] The European Union, in CTF table 4, reported a contribution from the LULUCF sector of –83,976.59 kt CO_2 eq in 2011 as part of the information provided on progress made towards its target. That value is not included in the table as the Party's unconditional commitment to reduce its emissions by 20 per cent by 2020 compared with in 1990 does not include emissions/removals from LULUCF.

[d] The European Union, in CTF table 4, reported a quantity of units from market-based mechanisms of 2,761,335 kt CO_2 eq in 2011 as part of the information provided on progress made towards its target. The table includes the estimated annual effect of the use of Kyoto Protocol mechanisms in the first commitment period (under the European Union Emissions Trading System and from member States), as reported in the Party's first biennial report.

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[f] Iceland, in CTF table 4, reported a contribution from the LULUCF sector of 1,171 kt CO_2 eq in 1990 and 746 kt CO_2 eq in 2011 as part of the information provided on progress made towards its target. That information, however, corresponds to accounting for the LULUCF sector using the land-based approach, although the Party stated that the contribution of LULUCF is calculated using the activity-based approach. The table includes values from CTF table 4(a)II for the activity-based approach for LULUCF in 2011.

[g] The Russian Federation, in CTF table 4, reported a quantity of units from market-based mechanisms of 16,501,175 kt CO_2 eq in 2011 as part of the information provided on progress made towards its target. That value is not included in the table, as it is seven times higher than the value reported for emissions in 2011.

C. Projected achievement of targets

103. While the comparison of the calculated targets and projections can give a general indication of whether Parties' implemented, adopted and planned measures are sufficient for them to meet their targets, the figures are not directly comparable, because of differences in the GWP values and LULUCF accounting methods used. These accounting differences, along with the use of market-based mechanisms in some cases, could possibly be large enough to cover the apparent deficits between the targets and the projections.

104. However, accounting differences aside, when comparing the reported information on the 'with measures' and 'with additional measures' projections (see table 6) and the calculated target year emissions in table 13, it appears that many Parties expect that they can achieve their 2020 targets with currently implemented and adopted PaMs alone, namely the EU and its member States, and some Parties need to put additional PaMs in place to achieve their targets.

VI. Policies and measures

A. Overview

1. Status of policies and measures

105. This chapter describes the principal climate change mitigation PaMs reported by the 43 Annex I Parties (42 countries and the EU) that submitted their BR1s and NC6s[27] and highlights the major changes in comparison with the PaMs reported in the NC5s.

106. Since 1 January 2010, when the NC5s were due, **Parties have added some important PaMs** to their portfolios for climate change mitigation, but **mostly they have worked at strengthening and refining their existing PaMs** – implementing more stringent features, achieving wider coverage and increasing resource expenditure. Overall, most Parties have kept to the general strategies and portfolios of PaMs reported as implemented or adopted in their NC5s. Notable exceptions are Australia, which has instituted major reforms to its climate change strategy and policies,[28] and the United States, which has begun regulating CO_2 emissions from power plants following the failure to establish a national emissions trading scheme (ETS). Hence, the general mix of PaMs – economic and fiscal instruments, regulations, voluntary/negotiated agreements, framework targets, information, education and awareness programmes, research and development (R&D), and other instruments – reported in the NC6s and BR1s is very similar to that reported in the NC5s.

107. The information reported in the NC6s and BR1s suggests that **most Parties continue to view climate change as a prominent policy concern**, with all Parties having national climate change strategies, action plans and programmes with mitigation PaMs. Some 1,448 implemented, adopted and planned mitigation PaMs, with highly diverse scopes and expected emission impacts, were reported. The PaMs are used at all levels of governmental jurisdiction – regional, national, state/provincial and municipal – to influence the investments, purchases and behaviours of numerous individuals and institutions

[27] This figure includes Turkey, which submitted its NC5 on 17 December 2013. It also includes Kazakhstan.

[28] The centrepiece of Australia's reforms, the Carbon Pricing Mechanism, was repealed in July 2014, after the submission of its NC6.

involved in a myriad of activities related to energy supply, energy end-use and non-energy emissions.

108. PaMs – along with some unrelated technological improvements, behavioural changes and economic and demographic shifts – are limiting growth in GHG emissions. For example, among non-EIT Parties, Belgium, Denmark, EU, Finland, France, Germany, Italy, Liechtenstein, Luxembourg, Monaco, Netherlands, Sweden, Switzerland and United Kingdom (without LULUCF), plus Norway and Portugal (with LULUCF), succeeded in reducing their GHG emissions by 2012 to below 1990 levels. Emissions of all EIT Parties also declined over the same period[29] (see figure 8).

2. Emerging trends in policies and measures

109. The multitude of climate change PaMs is diverse and complex, but the following emerging trends are apparent:[30]

(a) The first commitment period of the Kyoto Protocol (2008–2012) has passed and **nearly all Parties** have **developed new short-term quantified emission reduction targets for 2020** (see chapter IV);

(b) To meet their 2020 targets, **Parties have mostly strengthened and refined the details of their existing PaMs** (e.g. the EU ETS phase 3 reforms and more stringent vehicle standards in the United States and Canada) – to further reduce emissions, cut costs, diminish the administrative burden, etc. – as lessons are learned and market and technological conditions evolve. They have also **implemented some major new PaMs** – some reported as planned in the NC5s (e.g. United States regulations on emissions from power plants and the EU effort-sharing decision); and some new in the NC6s and BR1s (e.g. Australia's Carbon Pricing Mechanism (CPM) and the EU energy efficiency directive);

(c) Many Parties now have their broad, foundational PaMs in place (e.g. carbon pricing systems, vehicle and power plant regulations, and market reforms) and are increasingly using more flexible policy instruments. For example framework targets, which usually have a broad coverage, sometimes include project funding features to realize the mitigation potential in niche – or site-specific – situations. Framework targets (or burden-sharing commitments), in the context of multilevel governance, are used to devolve partial responsibilities for mitigation to lower levels of government (e.g. EU member States and states/provinces). They are increasingly specific – and often legally binding – in their mandates. The associated mitigation projects, sometimes funded by Parties from recycled revenues from ETS auctions and carbon taxes or other sources, are often administered by local authorities, which are closer to the niche opportunities;

(d) **Renewable energy production and use has grown rapidly** in recent years (during the period 2004–2012 the non-hydropower renewable energy share of total electricity consumption grew from 2.5 to 11.2 per cent in the EU and from 2.2 to 5.7 per cent in the United States), in part because of PaMs-based production targets and price incentives. This growth has contributed greatly to emission reductions and many Parties are working towards still higher renewable energy targets in the 2020 time frame. However, as renewable energy technologies have matured and their costs have fallen, **some Parties are questioning whether current levels of incentives and subsidies are necessary to meet the higher targets**;

[29] Calculations use 1990 data for all Parties, except for those for which the base year is defined by decisions 9/CP.2 and 11/CP.4: Bulgaria (1988), Hungary (average of 1985–1987), Poland (1988), Romania (1989) and Slovenia (1986).

[30] For the continued characteristics of policies and measures, see FCCC/SBI/2011/INF.1/Add.1, p. 37, paragraph 93 at < http://unfccc.int/resource/docs/2011/sbi/eng/inf01a01.pdf>.

(e) Parties continue to promote mitigation through PaMs traditionally associated with **energy goals** (e.g. **vehicle** fuel economy), but are increasingly drawing attention to the **emission reduction aspects** of those PaMs. For example, standards for vehicles in Canada, EU and United States are now defined in terms of both fuel economy and GHG emissions. Also, building labelling programmes in the EU include a measure of GHG emissions as well as energy use;

(f) Parties, in the context of job creation and economic competitiveness, are increasingly supporting the interests of their business and commercial enterprises through PaMs focused on low-carbon technology innovations and investments;

(g) In the light of the Fukushima Daiichi nuclear power plant accident, **some Parties have decided to re-examine the political viability of** (and, in some cases, phase out) **their use of nuclear power**;

(h) Some Parties, namely Australia and EU, have begun seeking – through ETSs and associated offset programmes – increased emission reductions in the oil, natural gas and coal sectors (e.g. **fugitive emissions**) and in the **agriculture and forestry sectors**.

B. Types and characteristics of main policies and measures

110. Parties reported a wide variety of PaMs to mitigate GHG emissions in their NC6s and BR1s. The variety reflects the great diversity of human activities – the numerous investments, purchases and behaviours of many individuals and organizations in varying circumstances – that must be influenced to mitigate climate change. To help to understand the underlying structures of and trends in these diverse PaMs, they are characterized according to the general categories outlined in table 14. The categories closely follow those used in the fourth and fifth compilation and synthesis reports. They help to focus the compilation and synthesis, but offer only approximate descriptions of the PaMs, as some PaMs do not fit well within the categorization scheme and some PaMs contain elements of multiple categories.

Table 14
Types, characteristics and examples of policies and measures

Policy type	*Characteristics and examples*
Economic and fiscal instruments	
Carbon and energy taxes	Carbon taxes – one of the two measures aimed at creating a uniform carbon price – are typically applied to fuels and electricity, seeking to raise their prices in a manner consistent with their inherent emission factors. Other energy taxes (e.g. ad valorem and excise taxes), while greatly influencing energy use and CO_2 emissions, have historically been used to raise revenue and enhance oil security, and most Parties continue to tax energy for those purposes
Emissions trading schemes	Emissions trading schemes – the other measure aimed at creating a uniform carbon price – are used to create a price for carbon indirectly, by requiring emitters to submit a tradable certificate (or allowance) for each tonne of their CO_2 emissions, while limiting the quantity of available certificates via a quota or cap
Other market instruments (other quotas and certificates) and reforms	Other quota and certificate systems are used to add flexibility of implementation (and reduce costs) in meeting other climate-related regulations and targets. The certificates are denominated not in tonnes of direct emissions but rather in amounts of: electricity production from renewable energy sources (RES) (green certificates); electricity production from combined heat and power (blue certificates); energy savings (white certificates); and landfill waste reduction (landfill allowance

Policy type	*Characteristics and examples*
	certificates). Electricity and gas market reforms, including energy pricing subsidy reforms, are used to increase the openness, efficiency and competitiveness of the energy supply and energy efficiency service sector (e.g. energy-performance contracting)
Other fiscal and economic incentives (fees, rebates, subsidies and project funding)	Fiscal and economic incentives – used to promote or penalize certain purchases, investments or behaviour through financial means – can take many forms, including: subsidies for energy-efficient product purchases or home renovations; project financing assistance; guaranteed minimum feed-in tariffs for electricity production from RES; differentiated purchase fees and rebates on automobiles based on fuel economy; road use charges; landfill usage charges; and grants, loans and guarantees for emission mitigation projects
Regulations (rules, standards and permitting requirements)	Regulations (rules, standards and permitting requirements) are used to directly shape the market by reducing the role played by less-efficient, more carbon-intensive products (e.g. making it illegal to sell poorly performing equipment) or by increasing the role of climate-friendly operating practices (e.g. requiring industrial plants to undergo energy audits or use best available technologies). Regulations take many forms, including: appliance and equipment efficiency standards; building codes; landfill operating standards; manufacturing and power plant permitting criteria; and power plant fuel share obligations (e.g. a minimum share of RES)
Voluntary/negotiated agreements	Voluntary sectoral commitments encompass a variety of industry sector–government arrangements that range from covenants with binding targets and severe repercussions for non-compliance to agreements with aspirational targets and mild consequences for failure to attain them. Voluntary enterprise partnerships are a diverse group of programmes aimed at individual companies, with various mixes of information, education, promotion, advice, decision aids, inventories, assessments, audits, strategies, action plans, aspirational challenges and targets, monitoring systems, benchmarks, performance indicators, public reporting, public recognition, public–private cooperative action and sometimes financing
Framework targets with measurement, reporting and verification (MRV) of emissions	Framework targets establish legally binding (i.e. mandatory) or indicative (i.e. voluntary) goals for emission levels (carbon budgets), technology shares, fuel shares and efficiency, followed up by MRV procedures to ensure compliance. Framework targets are intermediate measures used by Parties to focus the direction and stringency of their operational policies and measures (PaMs) or to partially shift responsibilities for mitigation to lower levels of government, which must then implement their own operational PaMs (e.g. economic incentives and market instruments) to achieve the targets
Information, education and awareness (labels, auditing, metering, advice and demonstration) programmes	Information, education and awareness programmes – intended to improve the availability and accuracy of information about the emission and energy characteristics of appliances and equipment – include labels for household appliances and entertainment devices; office equipment and buildings, and audits for buildings (in the residential, commercial and public sectors), best practice manuals, motor ratings and plant audits (in the industrial sector) and labels for automobiles and tyres (in the transport sector). Models and demonstrations – seeking to increase confidence (i.e. reduce perceived risk) in new technological methods for reducing emissions – are used mostly in the areas of commercial buildings, energy supply (power generation and transport fuel) and agriculture
Research and development	Research and development policies – intended to provide a long-term signal to the industry to enhance its ability to deliver necessary emission reductions in the energy supply, energy end-use and non-energy fields, while improving Parties' competitive position in the potential markets for the new technologies – include direct funding and contributions to joint international research efforts

Policy type	*Characteristics and examples*
Other	
Public facilities, vehicles, infrastructure and waste management	Planning, auditing, management, procurement and maintenance policies are used by governments to reduce emissions from the public facilities, offices, vehicles, equipment, infrastructure and waste management services under their jurisdiction
Urban and regional development and land use	Urban and regional development and land-use policies seek to gain efficiencies and emission reductions through tighter integration among the components of large systems and networks

C. Occurrence, distribution and effects of policies and measures

111. Tables 15–20 show the relative distribution of the PaMs reported by Parties in their NC6s and BR1s. Most of the tables do not include the 73 PaMs reported by the EU, in order to avoid the double counting of estimated mitigation effects (this is specified in the individual table headings). Table 15 shows the number of PaMs, classified by emitting sector and policy type. In total, 1,448 implemented, adopted and planned PaMs (including the 73 EU PaMs) were reported. Some 1,094 PaMs were aimed at single emitting sectors using single policy types, while 281 PaMs were classified as cross-sectoral and/or multi policy type. The most common targets of the reported PaMs were the energy (516 PaMs) and transport (320 PaMs) sectors. The energy (excluding transport and industry) and industry/industrial processes sectors are relatively more amenable to cross-sectoral PaMs. The transport, agriculture, forestry and waste sectors are more suited to single sector-focused PaMs. The most common policy types are regulatory (455 PaMs), other (418 PaMs), economic (403 PaMs) and information related (149 PaMs).

Box 1

A caution about estimated mitigation impacts

Parties provided estimated mitigation impacts for about 45 per cent of the reported policies and measures (PaMs). There are often methodological difficulties in estimating the mitigation impacts of individual PaMs (e.g. understanding baseline or counterfactual conditions, free ridership, rebound effects and interactions among PaMs).

In cases where multiple PaMs are responsible for a given set of mitigation effects (i.e. PaM interaction), Parties assigned mitigation impacts among the various interrelated PaMs using various methodologies. This means that great care must be taken in drawing conclusions about the relative importance of various types of PaMs from the information presented in tables 15–20. Depending on how Parties assigned mitigation effects, certain policy types may appear to be more or less important than they actually are.

One notable example is that few Parties assigned mitigation impacts to the European Union Emissions Trading System (EU ETS), even though it is one of the central elements of the European Union climate and energy package. This is most likely due to the effects being assigned to other policies implemented in conjunction with the EU ETS framework. The mitigation impact of the EU ETS, as calculated by subtracting the target 2020 emission level from the historical emission level in 2005, is estimated to be 530 Mt CO_2 eq by 2020 (reduction in annual emissions compared with in 2005).

112. Some 657 of the reported PaMs included estimates of mitigation impact (i.e. avoided annual emissions) by 2020 (see box 1 for a caution about these estimates). The total estimated impact of those PaMs by 2020 is 3,195 Mt CO_2 eq.[31] Table 16 shows the estimated mitigation impacts of the PaMs, classified by emitting sector and policy type. The policy types with the greatest impacts are regulations (1,332 Mt CO_2 eq), economic policies (1,205 Mt CO_2 eq),[32] other policies (1,070 Mt CO_2 eq), information policies (603 Mt CO_2 eq) and voluntary approaches (553 Mt CO_2 eq). The sectors experiencing the greatest impacts are the energy (excluding transport and industry) (1,431 Mt CO_2 eq) and transport sectors (803 Mt CO_2 eq). More specifically, regulations applied in the energy and transport sectors seem to have the largest expected mitigation impact.

113. Table 17 shows the distribution of the mitigation impact of the reported PaMs and shows details of the top 22 highest-impact PaMs. The top 22 PaMs, with impacts ranging from 50 to 750 Mt CO_2 eq of avoided annual emissions by 2020, are mostly regulatory policies aimed at the energy and transport sectors, but also include voluntary, economic, fiscal and information-related policies. Most are aimed at reducing CO_2 emissions, but one is focused on reducing PFCs, HFCs and SF_6. Implementation of three of the high-impact PaMs started during or after 2011 (i.e. they were newly reported in the NC6s and BR1s).

114. Table 18 shows that three quarters of the reported PaMs (accounting for 87 per cent of the total estimated mitigation impact) have already been implemented. Some 13 per cent of the PaMs (accounting for 10 per cent of the total estimated mitigation impact) have been adopted, but not yet implemented. About a quarter of the PaMs, accounting for about 13 per cent of the estimated mitigation impact by 2020, have implementation start dates in 2011 or later, which corresponds to the NC6 reporting period.

115. Table 19 shows that nearly half of the reported PaMs are aimed solely at CO_2 emission reductions and account for about half of the total estimated mitigation impact. Some 35 per cent of the PaMs are aimed at reducing emissions of multiple GHGs.

116. Table 20 provides a more subjective assessment of the relative importance of the categories of PaMs to the major emission sectors. Because of the stability in the mix of PaMs, this table is very similar to that in the CS5. It indicates that ETSs and mandatory regulations are especially important in the electricity and heat production, transport fuel supply and demand, and industry sectors. Regulations and some fiscal and economic incentives have large impacts in the transport, waste, agriculture and LULUCF sectors. R&D is mainly applied in the electricity, industry and transport sectors.

[31] This result differs somewhat from the estimated total effect of PaMs reported in paragraph 73 above. The difference likely arises from the fact that some Parties calculate the total effect of their PaMs by taking the difference between the 'with measures' and 'without measures' scenarios, rather than by aggregating the effects of individual PaMs.

[32] This figure includes the mitigation impact of the EU ETS, as calculated by subtracting the target 2020 emission level from the historical emission level in 2005, of 530 Mt CO_2 eq of avoided annual emissions by 2020 (compared with in 2005).

Table 15

Number and distribution of policies and measures reported in the sixth national communications and first biennial reports, classified by emitting sector and policy type (includes European Union member States; excludes the European Union)

		Emitting sector																		
		Energy		*Transport*		*Industry (industrial processes)*		*Agriculture*		*Forestry (LULUCF)*		*Waste*		*Other*		*Cross-cutting*		*All sectors*		*Total*
Policy type		*Single sector*	*Multi sector*	*Single sector*	*Multi sector*	*Single sector*	*Multi sector*	*Single sector*	*Multi sector*	*Single sector*	*Multi sector*	*Single sector*	*Multi sector*	*Single sector*	*Multi sector*	*Single sector*	*Multi sector*	*Single sector*	*Multi sector*	
Economic	Single	95	47	43	10	14	20	17	7	6	5	10	2	49	16	23	11	257	42	**299**
	Multi	40	18	16	3	4	5	10	3	3	2	5	4	5	6	5	2	88	16	**104**
Fiscal	Single	17	5	29	4	2	1	4	2	–	–	2	–	8	–	11	–	73	5	**78**
	Multi	19	10	17	5	3	3	3	1	2	1	2	1	–	4	1	1	47	10	**57**
Voluntary	Single	13	12	10	10	10	3	–	–	1	2	2	2	8	1	–	1	44	10	**54**
	Multi	7	6	8	4	3	2	3	2	5	1	1	2	8	3	3	–	38	7	**45**
Regulatory	Single	71	28	49	21	27	4	22	5	11	8	37	8	66	8	16	9	299	33	**332**
	Multi	45	17	23	8	7	9	8	8	7	6	4	6	4	6	4	3	102	21	**123**
Information	Single	13	3	5	–	1	–	8	–	–	–	1	–	–	2	2	15	2	44	4	**48**
	Multi	29	9	18	6	5	2	9	5	6	2	4	2	14	4	6	2	91	10	**101**
Education	Single	2	–	3	–	3	–	2	1	–	–	1	–	3	–	9	–	23	1	**24**
	Multi	10	6	6	3	4	2	9	2	3	1	3	3	4	–	3	1	42	6	**48**
Research	Single	3	1	1	1	–	–	3	–	–	–	–	–	–	–	–	–	7	1	**8**
	Multi	4	2	4	2	1	2	9	3	3	3	–	1	1	–	3	2	25	4	**29**
Other	Single	111	36	83	13	12	13	35	10	20	4	29	13	36	3	21	2	347	35	**382**
	Multi	8	5	5	3	2	1	7	1	2	1	3	2	1	2	2	–	30	6	**36**
All policy types	Single	325	132	223	59	69	41	91	25	38	20	81	25	172	30	95	25	1 094	131	**1 225**
	Multi	40	19	31	7	11	5	11	5	7	3	6	5	12	6	6	3	124	26	**150**
Total		**365**	**151**	**254**	**66**	**80**	**46**	**102**	**30**	**45**	**23**	**87**	**30**	**184**	**36**	**101**	**28**	**1 218**	**157**	**1 375**

Notes: (1) Policies and measures (PaMs) are classified primarily according to the targeted emitting sector (columns) and policy type (rows). For each emitting sector/policy type combination, the PaMs are further classified as single or multi sector, depending on whether they are targeted only at the designated sector (single) or are cross-sectoral PaMs targeted at the designated sector plus additional sectors (multi). PaMs are also classified as single or multi policy type, depending on whether they encompass the designated policy type only (single) or are policy packages encompassing the designated type plus additional types (multi); (2) Each multisector and/or multi policy type PaM is classified under multiple emitting sectors and/or policy types, so the figures in the rows and columns labelled multi do not sum to the total.

Abbreviation: LULUCF = land use, land-use change and forestry.

Table 16

Distribution and estimated mitigation impact in 2020 in Mt CO_2 eq of policies and measures reported in the sixth national communications and first biennial reports, classified by emitting sector and policy type (includes European Union member States; excludes the European Union)

		Emitting sector																		
		Energy		*Transport*		*Industry (industrial processes)*		*Agriculture*		*Forestry (LULUCF)*		*Waste*		*Other*		*Cross-cutting*		*All sectors*		***Total***
Policy type		*Single sector*	*Multi sector*	*Single sector*	*Multi sector*	*Single sector*	*Multi sector*	*Single sector*	*Multi sector*	*Single sector*	*Multi sector*	*Single sector*	*Multi sector*	*Single sector*	*Multi sector*	*Single sector*	*Multi sector*	*Single sector*	*Multi sector*	
Economic	Single	103	69	10	5	9	35	1	<0.5	1	–	1	<0.5	43	15	42	2	210	50	**790**
	Multi	94	267	4	198	6	157	30	10	–	10	3	148	18	92	1	10	156	259	**415**
Fiscal	Single	12	2	3	<0.5	<0.5	2	<0.5	–	–	–	–	–	1	–	4	–	21	2	**22**
	Multi	89	26	15	3	5	3	2	–	1	–	<0.5	–	–	23	<0.5	–	112	26	**138**
Voluntary	Single	6	239	49	<0.5	8	–	–	–	<0.5	<0.5	<0.5	<0.5	241	<0.5	–	–	305	<0.5	**305**
	Multi	65	112	<0.5	52	14	4	31	10	–	7	3	7	55	72	–	–	168	80	**248**
Regulatory	Single	60	260	440	25	17	1	6	<0.5	19	1	8	1	411	<0.5	10	<0.5	970	3	**974**
	Multi	52	251	15	211	5	159	3	20	–	20	<0.5	158	14	92	7	10	97	261	**358**
Information	Single	2	<0.5	<0.5	–	<0.5	–	–	–	–	<0.5	–	–	3	–	–	–	5	<0.5	**5**
	Multi	24	72	3	52	<0.5	1	90	13	–	10	16	<0.5	376	71	7	10	516	82	**598**
Education	Single	<0.5	–	<0.5	–	–	–	<0.5	–	–	–	–	–	–	–	–	–	1	<0.5	**1**
	Multi	3	<0.5	10	–	11	<0.5	<0.5	3	–	–	<0.5	<0.5	13	–	7	–	43	<0.5	**43**
Research	Single	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Multi	10	<0.5	4	–	1	<0.5	2	10	–	10	–	–	–	–	–	10	17	10	**27**
Other	Single	101	154	37	13	2	24	69	18	60	17	73	17	491	3	4	–	796	32	**828**
	Multi	5	217	<0.5	198	10	148	–	–	–	–	<0.5	148	9	69	–	–	24	217	**242**
All policy types	Single	283	724	540	44	35	62	76	18	80	19	43	19	1 190	18	60	3	2 307	88	**2 394**
	Multi	136	288	20	201	23	160	30	13	–	10	183	148	67	92	7	10	465	336	**800**
Total		**419**	**1 012**	**559**	**244**	**58**	**221**	**105**	**31**	**80**	**29**	**226**	**168**	**1 257**	**110**	**67**	**13**	**2 771**	**423**	**3 195**

Notes: (1) Policies and measures (PaMs) are classified primarily according to the targeted emitting sector (columns) and the policy type (rows). For each emitting sector policy type combination, the PaMs are further classified as single or multi sector, depending on whether they are targeted only at the designated sector (single) or are cross-sectoral PaMs targeted at the designated sector plus additional sectors (multi). The PaMs are also classified as single or multi policy type, depending on whether they encompass only the designated policy type (single) or are policy packages encompassing the designated type plus additional types (multi). (2) Each multisector

and or multi policy type PaM is classified under multiple emitting sectors and or policy types, so the elements in the rows and columns labelled multi do not sum to the total.

Abbreviation: LULUCF = land use, land-use change and forestry.

[a] Revised to include the mitigation impact of the European Union Emissions Trading System (EU ETS), as calculated by subtracting the target 2020 emission level from the historical emission level in 2005, of 530 Mt CO_2 eq of avoided annual emissions by 2020 (compared with in 2005). The European Union did not report an expected emission reduction for the EU ETS, presumably because it would double count the mitigation impact of related PaMs (e.g. the Renewable Energy Road Map, Energy Efficiency Plan 2011, etc.). The unadjusted total reported mitigation impact of single policy type economic PaMs, of 260 Mt CO_2 eq, is included in the grand total

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Table 17

Distribution of the mitigation impact of the policies and measures reported in the sixth national communications and first biennial reports (except where noted, includes the European Union and its member States)

Range of estimated mitigation impacts by 2020 (Mt CO_2 eq)	*Number of policies and measures*	*Estimated mitigation impact by 2020 (Mt CO_2 eq)*	*Policies and measures (implemented and aimed at reducing CO_2 emissions, except where noted)*
100 or greater	14	3 744	
of which		750	European Union (EU) – Renewable Energy Road Map/EU directive on renewables (2009/28/EC) Sectors: energy and transport; type: regulatory; start: 2010
		740	EU – Energy Efficiency Plan 2011 (COM(2011) 109 final) (adopted) Sectors: energy and transport; type: regulatory; start: 2011
		530[a]	EU – European Union Emissions Trading System Sectors: energy, industry and transport; type: economic; start: 2005
		420	EU – Covenant of Mayors Sector: energy; type: voluntary agreement; start: 2008
		311	United States – Significant New Alternatives Policy Program (PFCs, HFCs and SF_6) Sector: other (industrial processes (non-CO_2)); type: regulatory/information; start: 1990
		236	United States – Light-Duty Vehicle Greenhouse Gas Emissions and Corporate Average Fuel Economy Standards Sector: transport; type: regulatory; start: 2010
		216	United States – Appliance and Equipment Energy Efficiency Standards Sector: other (energy: residential, commercial and industrial end-use); type: regulatory; start: 1987
		185	EU – EU directive on the energy performance of buildings (2010/31/EU) Sector: energy; type: regulatory; start: 2012
		183	United States – Landfill Air Regulations Sector: waste management/waste; start: 1996
		165	EU – Eco-design requirements for televisions (COM REG (EC) 642/2009) Sector: energy; type: regulatory; start: 2009
		148	Australia – Carbon Pricing Mechanism Sectors: energy, transport, industry/industrial processes and waste management/waste; type: economic, regulatory and other (international); start: 2012
		141	United States – ENERGY STAR labelled products Sector: other (energy: residential, commercial and industrial end-use); type: voluntary agreement; start: 1992
		138	United States – Renewable Fuel Standard Sector: transport; type: regulatory; start: 2010
		110	EU – Eco-design requirements for space heaters and combination heaters (planned)

Range of estimated mitigation impacts by 2020 ($MtCO_2$ eq)	*Number of policies and measures*	*Estimated mitigation impact by 2020 ($MtCO_2$ eq)*	*Policies and measures (implemented and aimed at reducing CO_2 emissions, except where noted)*
			Sector: energy; type: regulatory
50–100;	8	535	
of which:		94	United States – ENERGY STAR commercial buildings Sector: other (energy: residential, commercial and industrial end-use); type: voluntary agreement; start: 1995
		73	United States – Clean Energy Supply Programs Sector: other (energy: supply); type: other (voluntary/negotiated agreements); start: 2001
		73	United Kingdom – New energy supply policies (adopted)
		65	Netherlands – Sustainable Energy Production (SDE+) and other financial incentives for renewables Sector: energy; type: economic, fiscal and voluntary agreement; start: 2003
		64	EU – Eco-design requirements for electric motors (COM REG (EC)640/2009) Sector: energy; type: regulatory; start: 2009
		61	United States – Conservation Reserve Program Sector: agriculture; type: economic and information; start: 1985
		55	EU – EU directive on the specification of petrol, diesel and gas-oil (2009/30/EC) Sector: transport; type: regulatory; start: 2010
		50	Ukraine – State Target Economic Program of Energy Efficiency and Development of Alternative Energy Generation for 2010–2015 (adopted) Sectors: energy, transport and other (manufacturing industries and construction); type: economic, voluntary agreement, regulatory, information and other (budget financing); start: 2010
10–50	51	1 097	
5–10	35	254	
1–5	137	308	
0.5–1	81	59	
0.1–0.5	160	38	
0.1 or less	202	6	
Policies and measures with estimated mitigation impacts (includes EU member States; excludes the EU)	657	3 195	
Policies and measures without estimated mitigation impacts	761		
Total	**1 448**		

Note: In this table, the number of policies and measures classified by the size of their estimated mitigation impacts totals 688, comprising 657 excluding 31 of the European Union. Those 688 and the 761 policies and measures without estimated mitigation impacts both include the European Union Emissions Trading System for the reason explained below. The total of 1,448 policies and measures is therefore correct.

[a] Calculated by subtracting the target 2020 emission level from the historical emission level in 2005, resulting in 530 Mt CO_2 eq of avoided annual emissions by 2020 (compared with in 2005). The European Union did not report an expected emission reduction for the European Union Emissions Trading System, presumably because it would double count the mitigation impact of related policies and measures (e.g. the Renewable Energy Road Map, Energy Efficiency Plan 2011, etc.).

Table 18

Status of the policies and measures reported in the sixth national communications and first biennial reports (includes European Union member States; excludes the European Union)

Status	*Number*	*Number with estimated mitigation impact*	*Estimated mitigation impact by 2020 (Mt CO_2 eq)*
Implemented	1 041	486	2 772
Adopted	181	85	335
Planned	154	86	87
Total	**1 375**	**657**	**3 195**

Table 19

Distribution of the effects on greenhouse gases of the policies and measures reported in the sixth national communications and first biennial reports (includes European Union member States; excludes the European Union)

Greenhouse gas affected		*Number of PaMs*	*Number of PaMs with estimated mitigation impact*	*Estimated mitigation impact by 2020(Mt CO_2 eq)*
CO_2	Single gas	658	295	1 652
	Multi gas	431	234	712
CH_4	Single gas	91	52	303
	Multi gas	427	232	474
N_2O	Single gas	43	18	19
	Multi gas	431	235	480
PFCs	Single gas	3	3	-0.5
	Multi gas	71	23	494
HFCs	Single gas	15	10	28
	Multi gas	59	17	613
SF_6	Single gas	3	2	10
	Multi gas	50	15	337
Other or		74	21	140
All gases	Single gas	813	380	2 011
	Multi gas	488	256	1 043
Total		**1 375**	**657**	**3 195**

Notes: (1) The PaMs are classified primarily according to the targeted greenhouse gas (rows). For each gas, the PaMs are further classified as single or multi gas, depending on whether they are targeted only at the designated gas (single) or are targeted at the designated gas plus additional gases (multi). (2) Each multigas PaM is classified under each of the gases affected, so the elements in the rows labelled multi do not sum to the total.

Abbreviation: PaMs = policies and measures.

Table 20

Importance of the types of policies and measures reported in the sixth national communications and first biennial reports, based on their frequency of use and/or their estimated impacts within emitting sectors

	Emitting sector									
	Energy supply		*Energy consumption*		*Transport*			*Non-energy*		
Policy type	*Electricity and heat*	*Fugitive emissions at oil, gas and coal facilities*	*Residential, commercial and institutional*	*Industry*	*Transport fuel supply*	*Transport fuel demand*	*Industrial processes*	*Waste*	*Agriculture*	*Land use, land-use change and forestry*
Economic and fiscal instruments										
Carbon and energy taxes			■	□[a]		■				
Emissions trading schemes	■			■		□	□[a]			
Other market instruments (other quotas and certificates) and reforms	■		□							
Other fiscal and economic incentives (fees, rebates subsidies and project funding)	■		□		■	■		■	■	■
Regulations (rules, standards and permitting requirements)	■	■	■	■	■	■	■	■	□	■
Voluntary/negotiated agreements	□	■	■	□		□	■	■		□
Framework targets with measurement, reporting and verification of emissions			■			■				
Information, education and awareness (labels, auditing, advice, metering, advice and demonstration) programmes	□		■	□		■		□	□	
Research and development	■			■	■	■				
Other										
Public facilities, vehicles, infrastructure and waste management			■			■		■		■
Urban and regional development and land use		□	□			□				

Notes: (1) ■ signifies high importance based on frequency of use and/or estimated impact. (2) □ signifies medium importance based on frequency of use and/or estimated impact.

[a] Indirect influence.

D. Climate policy ambitions and implementation strategies

1. Climate policy ambitions

117. Nearly all Parties have committed to quantitative targets for reducing their GHG emissions by 2020. Some Parties (Australia, Finland, Germany, Japan, Monaco, Norway, United Kingdom and United States) have taken on additional, more ambitious, commitments for the post-2020 time-horizon. The United Kingdom's carbon budgets introduce the concept of targets with legally binding milestones (for details of Parties' GHG emission reduction targets, see chapter IV.A above).

2. Implementation strategy, multilevel governance and accountability

118. Parties are making increasing use of multilevel governance to better target PaMs in line with the diverse circumstances existing within their jurisdictions. In some cases, higher-level governments initiate the policy and then devolve the responsibility for mitigation to lower-level governments, which must implement their own PaMs to achieve the emission reductions. EU member States have responsibilities devolved to them by the European Commission. In federal systems (e.g. Canada), states and provinces have obligations devolved to them by the federal government. In some cases, lower-level governments initiate and implement PaMs themselves, because of the absence of consensus at the higher levels.

Initiated by national governments or the European Union

119. Mitigation responsibilities can be devolved to lower-level governments through framework targets, political mandates, cooperative agreements, recommendations, etc. In some cases, specific mitigation measures are prescribed in the devolution process. In others, only framework targets or project funding levels are prescribed and the government or private parties assuming responsibility decide what measures to implement (e.g. the EU renewable energy directive and the Canadian Clean Air and Climate Change Trust Fund for provincial mitigation). The targets and budgeting processes provide a long-term vision to guide general activity, while implicitly recognizing that the diversity of regional, national and local circumstances demands tailored implementing measures.

Multisector framework targets

120. **Framework targets** establish legally binding (i.e. mandatory) or indicative (i.e. voluntary) goals for GHG emissions (carbon budgets), technology shares, fuel shares and efficiency, followed up by measurement, reporting and verification (MRV) procedures to ensure compliance. Framework targets are intermediate PaMs used by Parties to focus the direction and stringency of their operational PaMs or to partially shift responsibility for mitigation to lower levels of government, which must then implement their own operational PaMs (e.g. economic incentives and market instruments) to achieve the targets. They are used most heavily by the EU, but other Parties use them as well. Two new EU framework targets, implemented since the NC5s, can be considered as cross-cutting PaMs by virtue of their wide sectoral scope.[33]

[33] The EU ETS, especially with its highly predictable, declining third phase cap, is in a sense also a framework target. The cap is the target and the choice of mitigation options used to meet it is left to the participants.

121. The **EU effort-sharing decision (406/2009/EC)** establishes legally binding annual targets for the emissions from non-ETS sectors of member States for the period 2013–2020. The sectors covered include: transport (except aviation), buildings, agriculture (excluding LULUCF) and waste. Each member State must define and implement national PaMs (e.g. promotion of public transport, energy performance standards for buildings, more efficient farming practices and conversion of animal waste to biogas) to limit the GHG emissions from those sectors.

122. The EU energy efficiency directive (2012/27/EU), a package comprising framework targets, market reforms, regulations, public facilities management, and information and awareness, is aimed at improving energy efficiency in all sectors in order to achieve the EU target, reported in its NC5, of a 20 per cent reduction of primary energy consumption by 2020 (discussed more fully in para. 189 below).

123. Framework targets that establish goals for technology shares, fuel shares and efficiency levels are used mostly in the areas of electricity and heat generation, transport fuel supply and emissions from landfills. They are used most heavily by the EU, most notably in the EU climate and energy package of specific targets for 2020, but other Parties use them as well.[34] They involve setting goals (e.g. to achieve by 2020 a 20 per cent share of final energy consumption from RES), but leave the development and implementation of specific measures to the EU member States. The most prominent EU directives of this type are: the EU burden-sharing agreement; the EU directive on the promotion of the use of energy from renewable sources; the EU landfill (of waste) directive; the EU packaging and packaging waste directive; and the EU waste electrical and electronic equipment (WEEE) directive. The recent EU energy efficiency directive (see paras. 122 above and 189 below) contains both framework targets and prescriptive injunctions on specific PaMs to achieve the required goals. The United Kingdom and Ireland introduced carbon budgets that set legally binding limits on the total GHG emissions allowed in successive time periods, which are further broken down into carbon budgets for each government department. Other Parties devolve responsibility through funding mechanisms. Canada, in particular, funds many climate change mitigation measures developed and administered by its provinces.

Initiated by state or local governments

124. In some cases, PaMs are initiated by the lower levels of government in the absence of consensus at the higher levels. In the United States (as reported in its NC6), some 29 states have adopted GHG reduction targets, 29 have renewable energy portfolio standards, 18 have energy efficiency resource standards and 4 have GHG performance standards for electrical power (maximum allowable emissions per MWh of electricity produced).

125. In addition, 10 states in the United States participate in the Regional Greenhouse Gas Initiative (RGGI) and seven states and four Canadian provinces participate in the Western Climate Initiative. **Regional and local ETSs** have been established in Alberta, California, Québec and Tokyo, and a **carbon tax** has been implemented in British Columbia.

[34] The EU climate and energy package encompasses: (a) a target to reduce GHG emissions by at least 20 per cent compared with in 1990 by 2020, with a commitment to strengthen that target to 30 per cent in the event of a satisfactory international agreement being reached; (b) a target to achieve 20 per cent of energy from renewable sources by 2020 (as a share of total EU gross final energy consumption), supplemented by a target to achieve a minimum of 10 per cent renewable transport fuel; and (c) a reiteration of the commitment to save 20 per cent of total primary energy consumption by 2020 compared with a 'business as usual' baseline.

Accountability through measurement, reporting and verification

126. Rigorous **MRV** of PaMs and emission trends is growing in importance as Parties increasingly devolve responsibilities for mitigation to lower levels of government and as they make greater use of project-level emission reductions. MRV increases the accountability of the entities responsible for the actions. It also alerts to the need for possible mid-course revisions to PaMs, on the basis of their real (ex-post) versus projected (ex-ante) performance. Furthermore, MRV increases the credibility of emission reductions from projects generating carbon offsets, thus increasing the market value of those offsets (see para. 134 below).

127. Among the largest MRV efforts is the EU **monitoring mechanism regulation (MMR)** and the associated European Semester (see para. 130 below). MMR, which entered into force in July 2013, enhances the EU GHG monitoring mechanism, which was established in 1993 and revised in 2004. It aims to improve the quality of the data reported, to help the EU and its member States to keep track of progress made towards meeting their emission targets for 2013–2020 and to facilitate the further development of the EU climate policy mix. MMR also introduces new elements, such as the reporting of:

(a) The low-carbon development strategies of the EU and its member States;

(b) Financial and technical support provided to developing countries and commitments arising from the 2009 Copenhagen Accord and 2010 Cancun Agreements;

(c) Emissions and removals from LULUCF;

(d) Member States' adaptation to climate change.

128. Specific monitoring and reporting provisions for companies related to emissions from installations covered by the EU ETS are covered by separate implementing legislation.

129. MMR also requires the European Commission to annually complete a report that assesses the progress made by the EU and its member States towards meeting their commitments under the Kyoto Protocol.

130. The related **EU European Semester** is a policy coordination exercise which assesses the progress made by each member State towards meeting its targets set out in the Europe 2020 strategy (the EU growth strategy). As part of this, the progress made towards attaining the targets set out in the EU climate and energy package is assessed on the basis of the National Reform Programmes of member States and projections of future GHG emissions. Following that analysis, the European Commission can provide member States with specific recommendations that can help them to strengthen the mainstreaming of climate action into broader economic policies.

131. There is also an MRV system for the **EU ETS**, implemented as part of its phase 3 reform. There are two new European Commission regulations, one specific to monitoring and reporting and the other to verification and accreditation. The latter introduces a framework of rules for the accreditation of verifiers to ensure that they possess the technical competence to perform the entrusted task in an independent and impartial manner and in conformity with the requirements and principles set out in the regulation.

132. The **United States GHG Reporting Rule**, issued in 2009, requires the reporting of GHG emissions by 41 industry groups, which, in general, emit more than 25,000 t CO_2 eq per year. The GHG Reporting Rule is intended to collect accurate and timely emission data to inform future policy decisions. Under the rule, direct emitters and suppliers of certain products that would result in GHG emissions if released, combusted or oxidized, or facilities that inject CO_2 underground (e.g. for geological sequestration), are required to submit electronic annual reports. The gases covered by the GHG Reporting Rule are CO_2,

CH_4, N_2O, HFCs, PFCs, SF_6 and other fluorinated gases, including NF_3 and hydrofluorinated ethers. The reporting programme covers about 85–90 per cent of the United States' total emissions from approximately 8,000 facilities. Annual reporting began in 2011 for emissions in the calendar year 2010. The GHG data are made available to the public in the United States Environmental Protection Agency (EPA) Facility Level Information on GreenHouse gases Tool (FLIGHT) and in the Envirofacts database.

133. **Japan's GHG Emissions Accounting, Reporting and Disclosure System** obliges emitters that annually exceed a fuel consumption of 1,500 kilolitres of crude oil equivalent, an electricity consumption of 6 GWh or, if they have more than 20 full-time employees, emissions of 3,000 t CO_2 eq to measure and report their emission volumes to the Government. The Government administrates the monitoring and reporting system by collecting and sorting the reported data and disclosing it to the public.

134. Parties have established **certification programmes for the generation and use of their carbon offsets**. Such MRV systems enhance the credibility and value of the offsets. **Australia's Carbon** Farming **Initiative (CFI)** is a voluntary carbon offset scheme which began in 2011. Under CFI, farmers and land managers are able to generate credits for activities undertaken on their land that lead to reductions in carbon emissions or increase the removal of carbon from the atmosphere. Those carbon credits can then be sold on the carbon market. **Japan's J-Credit Scheme**, established in April 2013, certifies credits from emission reductions from the introduction of energy-saving equipment, the use of renewable energy, and carbon sinks through appropriate forest management. The generated credits can be used to achieve the goals of the Commitment to a Low Carbon Society and for carbon offsetting, among others.

E. Implementation of cross-cutting policies and measures

135. Most PaMs are targeted at reducing emissions within a single sector, but some are broader, being aimed at reducing emissions in multiple sectors. They can, in the case of some Parties, be wide in scope – in terms of sectors and gases targeted – but they are rarely used on an economy-wide scale. The most common cross-cutting, multisector policies are **ETSs, carbon and energy taxes,** multisector **framework targets with MRV of emissions, project funding, R&D, and urban and regional development and land use**.

1. Emissions trading schemes

136. **ETSs** are the most widely used cross-cutting instrument. As at April 2014, there were 11 active ETSs in Annex I Parties: in Alberta, Australia, California, EU, New Zealand, Norway, Québec, Switzerland, Tokyo, United Kingdom and the north-eastern United States. As a result, 35 of the 43 Annex I Parties either have national ETSs or participate in multinational ETSs and an additional 3 have subnational ETSs within their borders. ETSs vary in scope, but most are aimed at reducing CO_2 emissions from electricity generation and industrial energy use; some also cover other sectors. They tend to expand to cover additional sectors and gases as they mature.

137. Since the NC5s, the following ETSs have been launched, linked or strengthened:

(a) New ETSs in Australia (repealed in July 2014), California and Québec;

(b) The Swiss ETS and the EU ETS (linking discussions) and the ETSs of California and Québec (linking discussions);

(c) The EU ETS (increase in coverage, phase 3 (2013–2020) provisions and discussions on back-loading).[21]

138. **Australia's CPM** of the Clean Energy Future Plan began in 2012 and was to link with the EU ETS in 2015, but was repealed in 2014. There were to be two stages. During the fixed-price period (2012–2014), the Government set the carbon price (23 Australian dollars (AUD) per tonne in the period 2012–2013), which was essentially a carbon tax. Then, beginning in 2014, the carbon price was to be set by the market. The ETS covered about 60 per cent of Australia's total emissions. The emissions covered included those from stationary energy, industrial processes, production of coal and gas (fugitive emission processes, except those from decommissioned coal mines) and emissions from waste (post July 2012). An equivalent carbon price was also to be applied to some transport fuels through the existing fuel tax regime and to synthetic GHGs through the Ozone Protection and Synthetic Greenhouse Gas Management Act 1989. Emissions not covered by the carbon price included those from the agriculture and forestry sectors, some emissions from transport and emissions from the combustion of biofuels and biomass. CPM was tied to CFI, which certifies offset credits for emission reductions in the agriculture and land-use sectors (see para. 134 above).

139. **California's Global Warming Solutions Act of 2006 (Assembly Bill 32)** established a state-wide target of reducing GHG emissions to the 1990 level by 2020. As part of a portfolio of measures implemented to achieve that target, the California Air Resources Board adopted cap-and-trade regulations in 2011. The programme established a declining cap, beginning in 2013, on emission sources responsible for approximately 85 per cent of California's GHG emissions, including refineries, power plants, industrial facilities and transportation fuels.

140. **Québec's cap-and-trade system** launched in January 2012, with the first compliance period starting in January 2013. Covered entities include about 80 establishments, mainly in the areas of industry and electricity generation, with annual GHG emissions equal to or greater than 25,000 t CO_2 eq. In 2015, the system will expand to cover the distribution of fuel used in the transportation, building, and small and medium-sized business sectors.

141. Québec and California formally harmonized and integrated their ETSs in January 2014.

142. The **EU ETS** – the world's largest ETS, which started in 2005 and encompasses about 11,000 large installations in the 28 EU countries, Iceland, Liechtenstein and Norway – **increased its sectoral and GHG coverage in 2012 and increased its stringency in 2013** (see box 2). From its initial coverage of CO_2 emissions from the electricity generation and industrial sectors, the EU ETS was expanded in 2012–2013 to include: other CO_2 emissions from petrochemicals, ammonia and aluminium production; N_2O emissions from the production of nitric, adipic and glyoxylic acid; and PFC emissions from aluminium production. The expansion was also to include domestic (intra-EU) and international aviation, but only intra-EU aviation is covered at present.

[21] Backloading consists in the postponement by the European Commission of the auctioning of 900 million allowances until 2019–2020 to allow demand to pick up.

Box 2

European Union Emissions Trading System – reforms in phase 3 (2013–2020)

A major revision approved in 2009 strengthens the European Union (EU) Emissions Trading System and makes it based on rules which are far more harmonized than before. The main changes are:

(a) A single, EU-wide cap on emissions applies in place of the previous system of national caps on emission allowances;

(b) Auctioning, not free allocation, is now the default method for allocating allowances. In 2013 more than 40 per cent of allowances were auctioned and this share will rise progressively each year;

(c) At least half of the revenues from the auctioning of general allowances and all of the revenues from auctioning aviation allowances must be used to combat climate change in Europe or other countries;

(d) For those allowances still given away for free, harmonized allocation rules apply, which are based on EU-wide ex-ante benchmarks tied to the performance of the most efficient installations in the EU;

(e) Some more sectors and gases are included (see para. 142 above);

(f) 300 million allowances are set aside in the New Entrants' Reserve (NER) to fund the deployment of innovative renewable energy technologies as well as carbon dioxide capture and storage through the NER300 programme.

143. To counter the current surplus supply of allowances in the EU ETS (due to free issuances exceeding demand during the period 2009–2012) and the resulting low carbon prices, the European Commission has taken the initiative of proposing that the auctioning of 900 million allowances be postponed from the years 2013–2015 until the years 2019–2020, when it is expected that demand will have picked up. This price support through the 'backloading' of auctions would be accomplished by amending the EU ETS Auctioning Regulation and is currently under discussion in the Council and European Parliament.

2. Carbon and energy taxes

144. **Carbon taxes** are used at the national level by 10 Parties, mostly in northern Europe. They have been a cornerstone of climate policies in Denmark (CO_2 tax), Finland (CO_2 tax), Netherlands (energy tax), Norway (CO_2 tax) and Sweden (CO_2 tax) since the early 1990s. More recently, they have been introduced in British Columbia (CO_2 tax), Germany (ecological tax), Ireland (CO_2 tax), Liechtenstein (CO_2 levy), Québec (CO_2 levy), Slovenia (CO_2 environmental tax), Switzerland (CO_2 levy) and United Kingdom (Climate Change Levy).

145. Where they are used, carbon taxes are typically applied to a wider range of sectors (e.g. to the electricity generation, transport, residential, commercial, public and less energy-intensive industrial sectors, and sometimes to more EIIs as well) than ETSs. Carbon taxes are not yet applied to non-energy sources of GHG emissions. Among the 11 European countries having both carbon taxes and ETSs, some offer special carbon tax exemptions for installations in the EU ETS, while others do not. In Switzerland, exemptions from CO_2 taxes are offered as an incentive to encourage firms to participate in the ETS.

146. Since the early 2000s, there has been much less policy effort directed at introducing new carbon taxes than at developing ETSs. However, carbon taxes have still been put forward as an alternative carbon pricing mechanism during policy deliberations in some

countries, especially when the complexities and shortcomings (e.g. price levels and price stability) of ETSs are discussed. Furthermore, some Parties (e.g. Norway and United Kingdom) are treating carbon taxes and ETSs as complementary measures, with the latter aimed at energy-intensive sectors, such as power generation and industry, and the former focused on the residential and commercial sectors.

147. The United Kingdom introduced a **carbon price floor**, a tax on fossil fuels used to generate electricity, in April 2013. It changes the existing Climate Change Levy regime by applying carbon price support rates to gas, solid fuels and liquefied petroleum gas. The minimum carbon price is meant to send an early and credible signal to incentivize billions of pounds of investment in low-carbon electricity generation now by providing certainty of the carbon price.

148. **Energy taxes** (e.g. ad valorem and excise taxes), which greatly influence energy use and GHG emissions, are used by all Annex I Parties. The primary purposes of energy taxes have historically been revenue generation and oil security. However, Parties are increasingly using their energy taxes to further their emission reduction goals, by differentiating rates to favour RES (e.g. tax exemption for biofuels).

3. Project funding

149. Direct **project funding**, though reported in previous national communications, has grown recently, owing to the greater responsibility for mitigation actions given to lower-level governments (via framework targets) and to increases in funding (from ETS revenues and other sources).

150. The revised **EU ETS directive** (see box 2) stipulates that at least half of the revenues from the auctioning of general allowances and all of the revenues from auctioning aviation allowances should be used, via fiscal or financial support policies or regulatory provisions, to combat climate change in Europe or other countries. However, few EU member States have actually earmarked their revenues from EU ETS auctions to climate change actions. **The New Entrants' Reserve allowance auction (NER300 programme)** is funded from the sale of 300 million emission allowances from the New Entrants' Reserve. NER300 aims to establish a demonstration programme comprising the best possible carbon dioxide capture and storage (CCS) and innovative renewable energy projects involving all member States. NER300 also seeks to leverage a considerable amount of private investment and/or national co-funding across the EU. Under the first call for proposals, in December 2012 the European Commission awarded funding with a total value of EUR 1.2 billion to 23 RES projects.

151. Only one EU member State, Germany, has formally earmarked all of its EU ETS revenues for national and international climate financing purposes. **Germany's Special Energy and Climate Fund**, financed by EU ETS revenues, funds the German Government's support of energy-efficient refurbishing and construction of housing and energy-related refurbishment of buildings used for municipal and social services infrastructure. Programme funding totalling EUR 1.5 billion annually is available from the fund from 2012 to 2014 to finance the Kreditanstalt für Wiederaufbau (KfW) development bank's Energy-Efficient Building and Energy-Efficient Refurbishment programmes. In addition, EUR 300 million is available each year from 2013 to 2020 for direct grants as part of those programmes. KfW support has also been available since 2011 for refurbishment solutions going beyond individual buildings. This ensures that RES can be used more extensively in urban neighbourhoods with many older buildings and gets other groups of investors involved in the refurbishment process. Neighbourhood concepts, the use of refurbishment managers and measures to supply district heating to neighbourhoods are being funded.

152. In the **Czech Republic**, **Act No. 383/2012 Coll.** implements the EU obligations so that 50 per cent of auction revenues are used to decrease the energy intensity of buildings, support innovations and clean technology in industry, ensure compliance with the Czech Republic's international commitments in the area of climate protection and cover the administrative costs associated with the operation of the EU ETS.

153. The **United States Energy Efficiency and Conservation Block Grant Program** has provided more than USD 2.7 billion in funding to local and state governments, tribal governments and territories to develop, promote, implement and manage energy efficiency and conservation projects that ultimately create jobs. It is the largest United States programme for direct investment in energy efficiency and renewable energy projects at the community level. Activities that may use grant funds range from strategic planning, information sharing and developing building codes, to installing renewable energy technologies and implementing technologies to reduce, capture and use GHGs emitted from landfills or similar sources.

154. The **United States Loan Guarantee Programs** enable the Department of Energy (DOE) to work with private companies and lenders to mitigate the financing risks associated with innovative and advanced energy technologies, thereby fostering their deployment on a broader, commercial scale. The DOE provides loan guarantees to qualifying projects that employ new or significantly improved energy technologies that avoid, reduce or sequester air pollutants or GHGs. There are 24 active loan guarantees.

155. **Australia's Clean Energy Finance Corporation (CEFC)** is an AUD 10 billion corporation that has invested in clean energy projects since 1 July 2013. The investments will deliver the financial capital needed to help Australia's economy transition to cleaner energy sources. CEFC will seek to co-finance clean energy projects with the private sector, working with the market to build industry capacity. The investments of CEFC will be divided into two streams, each with half of the allocated funding:

(a) The renewable energy stream will invest in renewable technologies, which may include geothermal, wave energy and large-scale solar power generation;

(b) The clean energy stream will invest more broadly, for example in low-emission cogeneration technology, but will still be able to invest in renewable energy.

156. CEFC will operate with the expectation of minimal budgetary assistance and make its investment decisions, independently of the Government, on the basis of rigorous commercial assessments. A variety of funding tools will be used to support projects, including loans on commercial or concessional terms and equity investments. To ensure that CEFC has continuing and stable funding, capital returned from its investments will be reinvested.

4. Research and development

157. **R&D** activities were reported by Australia, Canada, Denmark, EU, Finland, France, Germany, Ireland, Italy, Japan, Netherlands, Switzerland, United Kingdom and United States. Many other Parties reported contributions to joint international research efforts. The EU funds some of its demonstration projects through revenues from the EU ETS (see para. 150 above). R&D efforts are intended to improve the technical capacity to reduce emissions and also to improve Parties' competitive position in the potential markets for new technologies.

158. All emission reduction technologies can benefit from additional R&D, but the ones offering the largest potential emission reductions and facing the biggest technological challenges are: CCS, hydrogen networks, fuel cells, cellulosic biofuels and solar power

options. Owing to the long-term nature of R&D efforts, Parties are rarely able to estimate their specific effects on emissions.

159. Various long-term R&D efforts are directed at electricity and heat generation. Japan and United States fund the development of CCS and advanced nuclear fission power technologies. The United States also supports research on solar, geothermal and distributed energy technologies, while Canada funds mainly research on CCS. The EU Seventh Framework Programme (FP7), which ran from 2007 to 2013, included a budget of EUR 1.89 billion for "environment (including climate change)" and the mitigation of GHG emissions was a priority of projects across FP7. Australia has released technology road maps to advance solar thermal energy and geothermal energy. Germany's Innovation and New Energy Technologies programme supports a wide range of climate-related R&D efforts, including on: power station technologies, CHP, district heat, fuel cells, hydrogen, wind, bioenergy and biomaterials, efficient electricity use, storage systems, energy and resource efficiency in the construction sector, and energy efficiency in industry, commerce, trade and services. The programme also includes measures for supporting research into safety and final storage for the nuclear sector.

5. Urban and regional development and land-use measures

160. **Urban and regional development and land-use measures** seek to gain efficiencies and emission reductions through tighter integration among the components of large systems and networks. Japan has measures in place to make urban design, transport networks, power networks and industrial parks more climate friendly. Japan reported its intention to encourage low-carbon urban/regional structures and socioeconomic systems in the mid and long terms. It will promote: non fossil fuel energy use; citizen- and business-led GHG emission reductions; the rearrangement and improvement of regional environments (e.g. the promotion of the convenience of public transportation); improved energy use through the holistic and efficient use of energy; the implementation of countermeasures against urban heat islands; and the formation of Compact Cities by concentrating urban functions.

F. Implementation of policies and measures by sector

161. While the majority of PaMs target the energy sector, the predominant focus of reported PaMs targeting non-energy sectors is on the waste and industrial processes sectors. Policies aimed at mitigation in the agriculture and LULUCF sectors were reported to a somewhat lesser extent, but have increased since the NC5s.

1. Energy supply

162. The predominant focus of mitigation PaMs in the energy supply sector is on electricity and heat generation and, increasingly, on transport fuels. Those aimed at reducing fugitive emissions from oil, gas and coal production and distribution facilities were reported by only a few Parties.

Electricity and heat

163. Parties reported using substantially strengthened ETSs, regulations and framework targets (delivered through economic incentives and other market instruments), in addition to the continued use of voluntary enterprise partnerships and long-term R&D, directed at electricity and heat generation, in order:

(a) To increase the share of energy generation from sources that are less carbon-intensive than coal (i.e. RES, conventional and shale-based natural gas, and nuclear energy);

(b) To increase generation, transmission and distribution efficiency through CHP, grid upgrades, distributed (i.e. small-scale) generation and other means;

(c) To stimulate the development, deployment and dissemination of CCS in the longer term.

164. **ETSs** are used – nationally in 34 Parties and regionally in 2 additional Parties – to promote the reduction of emissions from electricity and heat generation using all of the technical means referred to in paragraph 163 above. All of the active ETSs, except the United Kingdom Energy Efficiency Scheme and the Tokyo Cap-and-Trade Program, cover the power sector. There is little information reported in the NC6s and BR1s on the actions undertaken by installations to reduce emissions and their effects so far. However, the NC6 of the EU shows that the average annual emissions from all EU ETS installations (mainly power plants) in the period 2008–2012 were lower by 135.2 Mt CO_2 eq, or 6 per cent, than in 2005.

165. As mentioned in paragraph 137 above, new ETSs have been implemented in Australia, California and Québec. In addition, the EU has implemented major steps to strengthen its ETS in its phase 3 (2013–2020) (see box 2). The **EU ETS** phase 3 reform that is of particular relevance to the power sector is the move towards the full auctioning of allowances, in place of the current system of cost-free allocation. From 2013, no allowances are allocated free of charge for electricity production, with the exception of only limited and temporary options to derogate from that rule.

166. **Regulations** are the principal type of PaMs aimed at reducing GHG emissions from power plants in the United States and Canada.

167. In the **United States**, the Environmental Protection Agency (EPA) submitted proposals for a **Carbon Pollution Standard for Future Fossil-fuel Power Plants** in April 2012 and September 2013 (see box 3). Emissions from power plants account for approximately 40 per cent of the United States' CO_2 emissions and represent the Party's single largest source of industrial GHG emissions. The September 2013 proposal, together with the ensuing rule-making process, will ensure that carbon pollution standards for new power plants reflect recent developments and trends in the power sector. For existing power plants, the plan directs EPA to issue a draft rule by June 2014 and a final rule by June 2015.

Box 3

The United States – regulating within existing legislation, the Clean Air Act

The difficulty of passing new legislation through the Congress, in particular on emissions trading, marked a turning point in the approach to regulating greenhouse gas (GHG) emissions used by the United States Administration, which elected to regulate within existing legislation. This was enabled by the 2007 ruling of the Supreme Court establishing that GHGs are pollutants that the United States Environmental Protection Agency has the authority to regulate under the Clean Air Act (CAA), enacted in 1963 and revised several times thereafter. Therefore, CAA became the foundation for introducing a significant body of GHG emission regulations that shifted the climate policy from relying mostly on voluntary approaches towards regulations with a higher degree of predictability of emission reduction outcomes. The effects of such regulations were complemented by a number of economic incentives, such as grants and tax credits, for example a production tax credit for non-hydro renewable energy.

168. **Canada** has also moved to regulate GHG emissions from coal-fired power plants. In September 2012, the federal Government published the final version of the **Reduction of**

Carbon Dioxide Emissions from Coal-fired Generation of Electricity Regulations. The regulations apply an emission intensity limit (performance standard) on new coal-fired electricity generation units and on old units that have reached the end of their useful life. They will ensure that coal-fired electricity generation in Canada operates as cleanly as high-efficiency natural gas fired electricity generation and that no new high-emitting coal-fired electricity units will be built in Canada. Under the regulations, the performance standard is set at the emission intensity level of 420 t CO_2/GWh. The standard will address CO_2 emissions from the combustion of coal, coal derivatives (e.g. syngas) and petroleum coke (petcoke).

169. The performance standard provisions of Canada's regulations come into force in July 2015. Any new units commissioned after that date will need to meet the performance standard. In 2020, the first old units will be subject to the performance standard, resulting, in that year, in an estimated 3 Mt CO_2 eq of avoided emissions. The regulations, in addition to other measures and commitments made by industry and provinces, particularly Ontario's mandated cessation of coal-fired electricity generation by the end of 2014, are projected to reduce annual GHG emissions from the sector by 41 Mt CO_2 eq (or 33 per cent) below the 2005 level by 2020. Significant further reductions will occur in subsequent years. Over the first 21 years, the regulations are expected to result in cumulative emission reductions of about 214 Mt CO_2 eq. In addition to contributing to Canada's climate change objectives, the measure will help to improve air quality in Canada.

170. In the Russian Federation, the main policy instruments for the energy supply sector are strategic documents and programmes adopted by the Government. For example, the Russian Energy Strategy 2030 focuses on increasing the energy efficiency of energy production, the development of energy infrastructure, flexibility and diversity in the energy markets, and increased efficiency in primary energy production. The strategy estimates the reduction of GHG emissions in the period 2013–2015 at a maximum of 83 per cent compared with the 2005 level; in the period 2020–2022 at a maximum of 90 per cent compared with the 2005 level; and by 2030 at a maximum of 105 per cent compared with the 2005 level. The Russian Federation expects the energy intensity of its GDP to decrease by 44 per cent by 2030 compared with in 2007.

Renewable energy sources in electricity generation

171. Encouraging the use of renewable energy sources in electricity generation (RES-E) is a prominent part of many Parties' efforts to reduce emissions from electricity and heat generation.

172. In their NC6s and BR1s, as in their NC5s, Parties reported a wide variety of PaMs to encourage RES-E, including **framework targets** (EU and Russian Federation), green certificates (Australia), tariff premiums (United States states, Canadian provinces and Ukraine) and voluntary enterprise partnerships (United States). Most EU member States reported meeting their RES-E targets through feed-in tariffs (fiscal incentives), while others, such as Poland, Romania and Sweden, use green certificates (other market instruments), and still others, such as Belgium, Italy and United Kingdom, use both feed-in tariffs and green certificates. Furthermore, some EU member States use additional investment grants, tax exemptions and fiscal incentives to promote RES-E.

173. For example, the EU indicated that all EU member States have ambitious RES-E targets under the 2001 and 2008 EU renewable energy directives. According to Eurostat, the contribution of RES-E to total gross electricity consumption in the EU and its 28 member States rose from 14.3 per cent in 2004 to 23.5 per cent in 2012, owing to the widespread use of **feed-in tariffs, tariff premiums, quota obligations (green certificates), investment grants, tax exemptions and fiscal incentives**.

174. With its 2010 National Renewable Energy Action Plan, France aims to bring the share of renewable energy in its primary energy supply to at least 23 per cent by 2020, with 27 per cent of electricity produced from RES. Implemented PaMs should enable renewable energy production to double over the period 2008–2020. Examples of such PaMs include the Renewable Heat Fund, which promotes the production of renewable heat including solar thermal, biomass and geothermal energy; sustainable development tax credits (available to individuals for the purchase of renewable energy equipment); and a combination of feed-in tariffs and tendering procedures for renewable electricity and heat.

175. According to the United States Energy Information Administration, in the United States the share of RES-E in total net electricity generation increased from 8.9 per cent in 2004 to 12.2 per cent in 2012, with the share of non-hydropower RES-E rising from 2.1 per cent to 5.4 per cent over the same period.

176. **At present, many EU member States are reviewing their national RES-E PaMs to improve their** overall **cost efficiency.** In addition, further reviews and changes to RES-E PaMs can be expected, in response to the European Commission's guidelines (published after the NC6s and BR1s were due) on state aid for environmental protection and energy.

177. Other programmes to promote RES-E include: the **Australian Renewable Energy Certificates** (green certificates) programme, which requires wholesale electricity companies to purchase increasing amounts of RES-E to meet the country's 20 per cent by 2020 renewable energy target; the **Canadian ecoENERGY for Renewable Power** programme and the **United States Renewable Energy Production Incentive**, both of which provide tariff premiums for RES-E; and the **United States Green Power Partnership** (voluntary enterprise partnership), which addresses the market barriers that stifle demand for RES-E.

178. There are also **R&D efforts** under way on RES-E. For example, Australia (Renewable Energy Demonstration Programme), Japan and New Zealand are offering new financial and technical assistance for various aspects (i.e. feasibility studies, R&D, the deployment of pre-commercial devices and the construction of commercial installations) of new renewable-based electricity generation projects.

Natural gas, nuclear power, combined heat and power and grid improvements

179. Several Parties (Australia (Queensland), Greece, Japan and Portugal) use **regulations** and **economic incentives** to increase the use of natural gas for electricity generation.

180. Finland uses permitting approval (a regulation) to promote the construction of nuclear power plants. Japan uses regulations to ensure power transmission capacity, so that long-term and stable nuclear power generation is feasible and economically attractive. Japan, France and other Parties using nuclear power also use public funding to reprocess spent nuclear fuel. Parties also provide risk insurance against nuclear plant construction and operational delays and liability claims arising from nuclear incidents, as well as loan guarantees for new plants. In the light of the Fukushima Daiichi nuclear power plant accident, some other Parties (e.g. Germany and Switzerland) have decided to phase out their use of nuclear power.

181. Parties also use measures to advance other specific technologies (e.g. CHP and grid improvements). Netherlands, Poland and the Flemish region of Belgium promote electricity production from CHP though the use of a blue certificates programme. The EU energy efficiency directive (first reported in its NC6; see paras. 122 above and 189 below) includes changes concerning CHP and district heating and cooling (repealing directive 2004/8/EC on CHP). All EU member States are obliged to assess their potential for high-efficiency CHP and efficient district heating and cooling by 31 December 2015. They have to develop

policies that promote efficient heating and cooling systems at the local and regional levels, especially in connection with high-efficiency CHP.

182. The United States uses the Combined Heat and Power Partnership (voluntary enterprise partnership) to provide technical assistance to organizations across multiple sectors that invest in CHP projects and to assist state governments in designing regulations that encourage investment in CHP. The United States Energy Transmission Infrastructure Program (voluntary enterprise partnership) seeks to develop a unified, forward-looking strategy for siting, allocating the cost of and coordinating the permitting for proposed transmission projects.

183. Some Parties mandate that electricity utilities take responsibility for helping consumers to save energy and reduce emissions. Energy savings (white certificates) programmes are used in Denmark, France, Italy and United Kingdom, and in New South Wales, Australia, the Flemish region of Belgium and certain states in the United States, and are being considered by Netherlands and Poland.

Fugitive emissions from oil, gas and coal facilities

184. In their NC6s and BR1s, Parties reported the use of **voluntary enterprise partnerships** in the United States, **regulations** in Norway, Poland and United States, and **voluntary sectoral commitments** in the Netherlands to enhance the capture and use or flaring of fugitive CH_4 emissions at oil, gas and coal production and distribution facilities.

185. New provisions to include fugitive CH_4 emissions in **ETSs** were reported by Australia and the EU. Russian Federation and Ukraine reported activities aimed at stemming losses in natural gas transportation.

186. In 2012, the United States issued regulations (Federal Air Standards for Oil and Natural Gas) concerning volatile organic compound emissions from the oil and natural gas industry. The regulatory standards achieve a significant co-benefit of CH_4 emission reductions, estimated at 39.9 Mt CO_2 eq of avoided annual emissions by 2020.

2. Energy consumption

187. Mitigation PaMs have been implemented in all of the major energy end-use sectors: residential, commercial and public, industry and transport. Most of the PaMs focus on improving **energy efficiency** (as opposed to fuel switching).

188. Most energy consumption related PaMs are sector specific or even more narrowly targeted. However, there are some broader policies being pursued, such as Japan's systems-oriented policies (e.g. urban design), reported in previous national communications.

Multisector energy efficiency

189. The EU has implemented a multisector, multi-PaM policy package aimed at energy efficiency. The EU **energy efficiency directive (2012/27/EU)**, first reported in its NC6, is a package comprising **framework targets, market reforms, regulations, public facilities management, and information and awareness**, aimed at improving energy efficiency in all sectors to achieve the EU target, reported in its NC5, of a 20 per cent reduction of primary energy consumption by 2020 compared with a 'business as usual' baseline. The key elements require members States:

(a) To establish indicative national energy efficiency targets (with annual MRV of progress) and submit National Energy Efficiency Action Plans;

(b) To take actions to remove market barriers (and to avoid market failures) in the energy market that are preventing increased energy efficiency at all stages of the energy chain;

(c) To require (for large companies) and support (for small and medium-sized enterprises) energy audits or energy management systems with energy audits;

(d) To renovate (minimum 3 per cent of the floor area each year) their central government buildings and encourage the government purchase of high energy efficiency performance products, services and buildings;

(e) To establish long-term strategies and PaMs for increasing investments in building renovation and improving customers' awareness of their energy consumption (e.g. through smart metering and billing);

(f) To assess their potential for high-efficiency CHP and efficient district heating and cooling and to develop PaMs which promote efficient heating, cooling and CHP systems at the local and regional levels.

190. The Energy Strategy of Ukraine is among the Party's key legislative and regulatory acts for the period until 2030. The strategy identifies goals and objectives for the state policy on energy conservation and efficient use of energy resources, and its implementation leads directly to GHG emission reductions. It also identifies quantitative targets for reducing the energy intensity of Ukraine's GDP in the period up to 2030 and the direction of the development of the energy sector, ensuring the achievement of such targets. In 2012, a revised version of the Energy Strategy was introduced for public discussion, but it has not yet been adopted. The strategy proposes a target for decreasing the energy intensity of the Party's economy by more than half by 2030 compared with the 2010 level.

Residential, commercial and public

191. Parties reported the continued use of regulations, fiscal incentives, framework targets, information, voluntary enterprise partnerships, public facilities management and carbon taxes:

(a) To increase the energy efficiency of new and existing residential, commercial and public buildings, including their space heating, cooling and ventilation, water heating and lighting services (via designing, building, renovating and purchasing);

(b) To increase the energy efficiency of household appliances, home entertainment devices, office equipment (via manufacturing, retailing and purchasing) and lamps;

(c) To increase the use of alternative energy supplies.

192. **Regulations (mandatory standards)** are widely used for buildings. For example, mandatory energy efficiency requirements for residential and commercial buildings, reported in the NC5s, continue to be used in Australia (National Construction Code), British Columbia and Ontario, Canada, and United States (Building Energy Codes). EU member States have begun implementing more stringent building codes, newly reported in the NC6 of the EU, in order to comply with the EU energy performance of buildings directive, reported in its NC5.

193. All Parties use regulations (mandatory standards) to a lesser or greater extent for household appliances, home entertainment devices, office equipment and, increasingly, lamps. Many Parties are undertaking programmes to phase out the use of incandescent light bulbs. Japan's Top Runner standards programme, reported in its NC5, is unique in that it automatically recalibrates itself: future standards are based on the most energy-efficient model on the current market, and the process periodically repeats itself. Australia's

standards programme, reported in its NC5, set its energy efficiency target at the equivalent of a world-best regulatory target or a more stringent level developed specifically for Australia.

194. In the United States, new energy efficiency standards for lighting will lead to the phasing out of incandescent light bulbs by the middle of the next decade and also of less-efficient fluorescent tubes. The new standards are estimated to have a GHG mitigation potential of 37.7 Mt CO_2 eq (avoided annual emissions) by 2020.

195. **Information-based measures**, primarily labels, ratings and certification programmes, are likewise used widely for appliances, devices and equipment, and increasingly for buildings as well. **Smart metering** is an important emerging type of information-based PaMs (see box 4).

196. **Fiscal incentives (subsidies and tax incentives)** reported in the NC5s continue to be used, for example for: energy efficiency improvements for low-income households in United Kingdom and United States; solar water heating in Portugal; solar, water and energy-efficient technologies in Australia; refurbishment of existing buildings and implementation of renewable heating systems, waste heat use and services engineering in Switzerland; and energy-efficient motors, lighting and building energy management systems in Ireland.

197. Other PaMs reported in the NC5s continue to be used, but have not changed significantly since then. In Australia, for example, **regulations** oblige electricity and natural gas suppliers to offer energy efficiency improvements. **Information (auditing and advice) programmes** are widely used. **Voluntary enterprise partnerships** are particularly important in the United States (ENERGY STAR for the residential market, ENERGY STAR for the commercial market and the Net-Zero Energy Commercial Building Initiative) to improve the performance of current and future buildings. **Public facilities management programmes**, which offer direct opportunities to improve energy efficiency and reduce carbon emissions, are used, for example, in Australia, Canada and United States.

198. **Green Investment Schemes (GIS)**, which aim to ensure that revenues from sales of surplus AAUs are spent on emission-reducing activities, are often linked to energy efficiency and RES in the building sector in EIT Parties. The goal is to assure buyers of AAUs that, even though the AAUs themselves may appear as surplus, their revenues will be spent on greening activities. GIS activities were reported in the NC6s and BR1s of Bulgaria, Czech Republic, Estonia, Hungary, Lithuania (plans), Poland, Romania (under study), Slovakia and Ukraine (establishment of a legal system).

Box 4

Smart metering – information and energy management services

Many Parties are beginning (or planning) the wide-scale deployment of smart meters and associated services, which will enable households and businesses to be more aware of their energy consumption patterns and to make behavioural and investment decisions accordingly.

In **Japan**, the Government will promote the introduction of smart meters as infrastructure and install them in all households and plants in the early 2020s. At the same time, the Government will promote the introduction of energy management systems, such as the Home Energy Management System and the Building Energy Management System, to develop an environment in which the entire country consumes energy in a smart manner, and will promote actions utilizing energy consumption data with the aim of optimizing consumption.

In the **European Union**, the **energy efficiency directive** (see para. 189 above) requires member States to reduce barriers for consumers by improving access to information on their energy consumption (e.g. through smart metering and billing). Smart metering will be provided to customers for electricity, natural gas, district heating and cooling, and hot water, if technically and economically feasible.

In the **United Kingdom**, the Government's vision is that every home and small business in the country should have a smart energy meter by 2020. Significant progress has been made in establishing the technical, commercial, regulatory and policy framework for the rollout. Energy supply companies, which will be responsible for the deployment of the meters, are now in the design, build and test phase ahead of an expected mass rollout from autumn 2015.

In **Ontario**, over 4.7 million smart meters, which track the electricity use of homes or businesses, have been installed to help Ontarians make more informed decisions about their electricity consumption.

Industry

199. Parties reported on the continued use of ETSs, regulations, voluntary sectoral commitments, voluntary enterprise partnerships, information and long-term R&D:

(a) To increase energy efficiency and general emission reductions (i.e. not targeting specific equipment and processes) in EIIs;

(b) To increase the implementation of energy-efficient methods (e.g. energy management systems) in industry;

(c) To increase the use of energy-efficient equipment (e.g. motors, boilers and lighting), particularly, but not exclusively, in small and medium-sized enterprises;

(d) To promote long-term R&D of CCS by EIIs.

200. Historically, most PaMs targeting industry have focused on energy efficiency and general emission reductions in EIIs. Increasingly, PaMs are also being aimed at less EIIs. Research on industrial CCS continues to be directed at EIIs.

201. **ETSs** have become the highest-profile method of promoting general emission reductions and encouraging long-term interest in CCS in EIIs. All of the active ETSs, except RGGI in north-east United States and the Tokyo Cap-and-Trade Program, cover the industrial sector.

202. One of the **EU ETS phase 3 reforms (see box 2)**, implemented since the NC5s, of particular relevance to the industrial sector is EIIs' receipt of free allowances, on the basis of ex-ante benchmarks tied to the average performance of the 10 per cent most-efficient installations, if their competitiveness is judged to be at risk due to less-stringent emission constraints in other parts of the world.

203. **Regulations and voluntary sectoral commitments** are considered to be important mitigation PaMs in the industrial sector in Japan and United States. In the United States, **permitting regulations** under the Clean Air Act (CAA), first reported in its NC5, require industrial plants to use Best Available Control Technologies for GHG emissions. CAA requires large stationary sources of air pollution to apply for and receive permits before building a new facility or modifying an existing facility. The permits now include information on the amount of GHGs that a facility can emit in addition to other requirements to ensure that public health and the environment continue to be protected after the facility begins to operate.

204. With regard to Japan, the Commitment to a Low Carbon Society **voluntary sectoral commitments** were first reported in its NC5. Through the formulation and publication of guidelines for controlling GHG emissions, on the basis of the Act on Promotion of Global Warming Countermeasures, the Government will encourage business operators to actively implement environmentally friendly business actions on a voluntary basis. The guidelines will be reviewed as necessary with reference to the development of available cutting-edge technologies (best available technologies). Each industry group is expected to formulate and implement GHG emission reduction plans (in line with the Commitment to a Low Carbon Society), whereby they should make maximum use of the world's most advanced low-carbon technologies, contribute to emission reductions in other sectors by providing low-carbon products and services, promote emission reductions in other countries, and develop and introduce innovative technologies. The formulation and progress statuses of those initiatives will continue to be assessed and verified by the Government.

205. **Regulations** have also been established in Japan that require industrial companies to benchmark their energy efficiency level against others within the same subsector and to meet medium- and long-term targets.

206. Although **voluntary sectoral commitments** were once the most important measure aimed at achieving emission reductions and energy efficiency in the industrial sector, they have been overshadowed in recent times by **ETSs** in many regions. The industrial sector agreements in European Parties have been eclipsed by the EU ETS for EIIs, but they are still playing a role in less emission-intensive, non-ETS sectors.

207. Other PaMs reported in earlier national communications continue to be used, but have not changed significantly. There are **voluntary enterprise partnerships**, such as the European Motor Challenge Programme and the United States Save Energy Now and ENERGY STAR for industry programmes. Benchmarking and best practice programmes are cited in many Parties' plans. **Regulations** (not related to ETSs) aimed at achieving emission reductions and energy efficiency are used in only a few special circumstances in the industrial sector because of the diversity of industrial processes and equipment. Regulations in Japan require industrial plants over a certain size to have an appointed energy manager. In Australia, companies over a certain size must participate in the Energy Efficiency Opportunities programme, requiring an assessment of their energy use to identify cost-effective energy efficiency opportunities, and report to the Government and the public on their business response. Australia, Canada, New Zealand and United States have implemented energy efficiency standards for electric motors. The EU integrated pollution prevention and control directive contains requirements that oblige industry to use best available technologies to ensure that energy is used efficiently.

Transport

208. Parties reported PaMs with two major objectives in the transport sector:

(a) Addressing transport fuel supply: reducing the carbon intensity of the transport fuel mix immediately through increased use of biofuels, but in the long term also through the use of electricity, fuel cells and hydrogen;

(b) Addressing transport fuel demand: increasing the efficiency and effectiveness of transport services and promoting non-motorized modes of transport.

Transport fuel supply

209. Parties reported on the continued use of **framework targets** (delivered through **economic incentives and other market instruments**), **regulations**, **other market instruments and long-term R&D** to increase the production, use and environmental sustainability of liquid RES fuels (biofuels), particularly in:

(a) The EU, where the EU renewable energy directive (framework target) sets mandatory targets. By 2020, the share of renewable energy shall amount to 10 per cent of fuels consumed in the transport sector, which can include biofuels, renewable electricity or hydrogen originating from RES. There are also established sustainability criteria for biofuels and bioliquids, which ensure that they are counted as RES only if they meet standards regarding biodiversity, the protection of rare, threatened or endangered species and ecosystems, and GHG emission savings. The principal national measures that EU member States are using to comply with the renewable energy directive framework targets for transport fuels are quota obligations and tax exemptions;

(b) The EU, where the EU fuel quality directive also introduced a binding target for fuel suppliers to reduce life-cycle GHG emissions per unit of energy by up to 6 per cent by 2020 compared with in 2010, and where the EU Clean Power for Transport package (adopted in 2013) supports the broad deployment of alternative-fuel vehicles and vessels and the relevant infrastructure in Europe;

(c) The United States, where the Renewable Fuel Standard was expanded to increase the volume of renewable fuel required to be blended into transportation fuel from 7.5 billion gallons (28.3 billion litres) in 2012 to 36 billion gallons (136.3 billion litres) by 2022 and to establish new volume requirements for biomass-based diesel and other advanced biofuels, including 16 billion gallons of cellulosic biofuel annually by 2022. The application of life-cycle GHG performance threshold standards is required to ensure that each category of renewable fuel emits fewer GHG emissions than the petroleum fuel it replaces;

(d) Canada, where the National Renewable Fuels Standard requires fuel producers and importers to have an average annual renewable fuel content of at least 5 per cent of the volume of gasoline that they produce or import, effective in 2010, and an average 2 per cent renewable fuel content in diesel fuel and heating oil by 2011 or earlier, subject to technical feasibility;

(e) Switzerland, where new tax incentives, compensated for by increased tax rates on petrol, are provided for the use of low-carbon fuels, including tax reductions for natural gas and liquid petroleum gas and complete tax exemptions for biogas and other biofuels fulfilling social and ecological criteria, such as: a minimum 40 per cent GHG emission reduction based on life-cycle analysis, a net environmental burden not significantly exceeding that of fossil fuels, and that the cultivation of biofuels must not endanger biodiversity, in particular in rainforests;

(f) New Zealand, where the ETS encompasses liquid fossil fuels.

210. Elsewhere, fiscal incentives are used to expand biofuel capacity and production in Australia (grants), to increase the purchase and use of biofuels in Canada (consumer tax exemptions), and to increase the production of biofuels in Canada and United States (capacity construction loan guarantees). Another measure is agricultural market reform, with its long-term fiscal incentives for biocrop production (EU).

211. Longer-term **R&D programmes** are focused on the on-board technology and the supporting fuelling infrastructure that would enable the widespread use of alternative-fuel vehicles, such as those that run on biofuels, electricity and hydrogen. Canada and United States continue to fund programmes on fuel cells, biofuels and hydrogen. Japan funds programmes on fuel cells and hydrogen. The EU FP7 includes a European Technology Platform for hydrogen and fuel cells. Japan is promoting systems approaches to emission reductions in transportation and shipping and distribution. Australia announced the Second Generation Biofuels Research and Development Program in 2008 and has released a technology road map to advance hydrogen and fuel cell technology.

Transport fuel demand

212. Parties reported on the continued use of regulations, ETSs, fiscal incentives and information programmes, as well as the continued use of regulations, voluntary sectoral commitments, fiscal incentives, voluntary enterprise partnerships, information and long-term R&D:

(a) To improve the energy efficiency and CO_2 emission intensity of road vehicle fleets;

(b) To address transport activity and structure through transport demand management (including intelligent transport systems), incentives for modal shifts towards less-polluting transport modes, such as public transport, cycling and walking, traffic-flow improvements and spatial planning;

(c) To improve the CO_2 emission intensity of domestic and international aviation.

213. **Road vehicle fuel economy and CO_2 emission standards**, implemented increasingly via **mandatory** regulations (replacing voluntary approaches), have the highest mitigation impact of any measures in the transport sector. Many of the standards have been newly established or substantially strengthened since the NC5s, including the following:

(a) Canada and United States implemented their strengthened Corporate Average Fuel Economy Standards and GHG standards for cars and light trucks for 2011/2012–2016 (reported in their NC5s; see box 5);

(b) Canada and United States have drawn up rules for the second phase of standards, for model years (MY) 2017–2025, for cars and light trucks;

(c) Canada and United States have established standards for MY 2014–2018 heavy-duty vehicles;

(d) The EU CO_2 and cars regulation (reported in its NC5) sets emission performance requirements for new passenger cars as part of an integrated approach to reducing CO_2 emissions from light-duty vehicles. Under the regulation, the fleet average to be achieved by all new cars is 130 g CO_2/km by 2015 – with the target to be phased in from 2012 – and 95 g/km by 2020. The 2015 a. d 2020 targets represent reductions of 18 per cent and 40 per cent, respectively, compared with the 2007 fleet average of 158.7 g CO_2/km. In terms of fuel consumption, the 2015 target is approximately equivalent to 5.6 l petrol/100 km or 4.9 l diesel/100 km. The 2020 target equates to approximately 4.1 l petrol/100 km or 3.6 l diesel/100 km;

(e) Japan's revised Top Runner standards programme, which emphasizes periodic recalibration (see para. 193 above) for continual improvement of automobiles (regulation).

Box 5

Canada and United States – strengthened Corporate Average Fuel Economy Standards and greenhouse gas standards for vehicles

New harmonized standards, with requirements for both fuel economy and greenhouse gas (GHG) emissions, for cars and light trucks with model years (MY) 2011/2012–2016 have been implemented. In the United States, the standards for light-duty trucks and passenger cars are projected to result in an average fleetwide tailpipe level of 250 g carbon dioxide (CO_2)/mile by MY 2016, including expected reductions in hydrofluorocarbon (HFC) emissions from air conditioners. This would be equivalent to 35.5 miles/gallon (57.1 km/gallon or 6.6 l/100 km) if achieved exclusively through fuel economy improvements. **The standards represent the first time that the United States Environmental Protection Agency (EPA) has promulgated federal emission standards for GHGs using its authority under the Clean Air Act** (see box 3)**, and also represent one of the largest increases in stringency since the inception of the Corporate Average Fuel Economy programme in the 1970s.**

Second phase standards for cars and light trucks with MY 2017–2025 have been drawn up. In the United States, the National Highway Traffic Safety Administration and EPA issued a joint final rule establishing the new standards in August 2012. At the time of the final rule, EPA projected that the MY 2025 standards would result in an average industry fleetwide tailpipe level of 163 g CO_2/mile by MY 2025, again including expected reductions in HFC emissions. This would be equivalent to 54.5 miles/gallon (87.7 km/gallon or 4.3 l/100 km) if achieved exclusively through fuel economy improvements. The combined fuel economy and GHG emission standards for MY 2012–2025 are projected to cut in half the GHG emissions of the average MY 2025 vehicle when compared with those of the average MY 2010 vehicle. In Canada, the amendments are due to be finalized in 2014. Passenger automobiles and light trucks are responsible for about 13 per cent of Canada's total GHG emissions and, similar to for the United States, it is expected that the cumulative actions will see GHG emissions from MY 2025 vehicles fall by up to 50 per cent compared with those of MY 2008 vehicles.

The two phases of standards for light-duty vehicles are projected to avoid 236 Mt CO_2 emissions annually in the United States and 13 Mt CO_2 annually in Canada by 2020.

Standards for MY 2014–2018 heavy-duty vehicles have also been established. In the United States, the standards are expected to achieve up to a 23 per cent reduction in GHG emissions and fuel consumption for semis (combination trucks) during the lifetime of the vehicle purchased between MY 2014 **and** 2018 and up to a 9 per cent reduction for buses, special-purpose trucks, such as garbage trucks, and other vocational vehicles.

The standards for heavy-duty vehicles are projected to cut 38 Mt CO_2 emissions annually in the United States and 3 Mt CO_2 annually in Canada by 2020.

214. Since the NC5s, the **EU ETS** has been expanded to partially cover the transport sector, with the planned addition of aviation being implemented only for flights within the EU member States, Iceland, Liechtenstein and Norway and between closely related

territories. The planned coverage of other flights arriving at and departing from airports in EU member States, Iceland, Liechtenstein and Norway was put on hold. This 'stopping the clock' decision was taken in order to facilitate the negotiation of a global agreement on emissions from aviation within the International Civil Aviation Organization (ICAO).

215. The **Australian ETS** (repealed in July 2014) excluded transport fuels but an equivalent carbon price was being applied through changes in **fuel tax credits or excise** for domestic aviation, domestic shipping, rail transport and non-transport use of fuels. The Australian Government was also seeking to establish an effective carbon price for heavy on-road liquid fuel use from 1 July 2014.

216. New **fiscal incentives** have been introduced to promote efficient vehicles in Canada (i.e. feebates) and France (i.e. bonus-malus) and to support the development of electric cars in New Zealand and Portugal. Fiscal **incentives** have also been implemented in Canada to support freight transport technology, advanced vehicle technology, municipal mode shifting, and vehicle buying, driving and maintenance initiatives. New **regulations and information (labels)** on the performance of tyres have been established in the EU. **Information (labelling)** on vehicles has commenced in New Zealand.

217. Bulgaria is planning to introduce **intelligent transport systems** within the national and urban road network.

218. There are other PaMs reported in the NC5s that continue to be used, but have not changed significantly. There are **fiscal incentives**, such as differentiated vehicle taxes and fees used in Austria, Belgium, Denmark, France, Germany, Italy, Japan, Luxembourg, Netherlands, Portugal, Sweden and United Kingdom, and infrastructure charging on heavy-goods vehicles used in Austria. Switzerland has an **obligation** (newly reported in its NC6) for transport fuel importers **to offset 5–40 per cent of transport-related CO_2 emissions** as of 2013. **Information (mandatory labels)** is used in Australia and the EU to show consumers the fuel economy and CO_2 emissions of new cars in order to encourage them to buy fuel-efficient models. In many countries, government-owned and -managed vehicle fleets are a significant source of emissions. **Government operations** programmes to increase the energy efficiency of and reduce CO_2 emissions from government vehicle fleets are used in Australia, Canada and United States. **Voluntary enterprise partnerships** are used mostly where relatively few decision makers can influence purchases and operations in relation to vehicle fleets. The United States uses the SmartWay Transport Partnership to accelerate the uptake of low-emission technologies and strategies in the freight and consumer sectors. Japan is promoting **systems approaches** to reducing emissions from transportation and shipping and distribution in the longer term.

International transport

219. A number of Parties reported on PaMs influencing GHG emissions from international transport. The information provided focuses on: specific PaMs; the relevant progress made by ICAO and the International Maritime Organization (IMO); the roles that Parties played within ICAO and/or IMO to promote and/or implement any relevant decisions; and the scope, principles and design of a global climate regime to regulate GHG emissions from international bunker fuels.[36]

3. Industrial processes

220. Parties reported new use of ETSs and information and continued use of their previous regulations, reporting, voluntary enterprise partnerships, voluntary sectoral commitments, fiscal incentives (taxes) and research:

[36] See document FCCC/SBI/2014/INF.21

(a) To limit (ban) the use of certain HFCs and PFCs used as substitutes for ozone-depleting substances (ODS);

(b) To improve the manufacturing, handling, use and end-of-life recovery of fluorine-containing gases used as substitutes for ODS;

(c) To reduce PFC, HFC and SF_6 emissions from semiconductor manufacture, PFC emissions from aluminium production, SF_6 emissions from electric power transmission and distribution and from magnesium production, and HFC and SF_6 emissions from miscellaneous sources;

(d) To reduce CO_2 emissions through improved operations in cement, lime and ammonia production;

(e) To reduce N_2O emissions through improved operations in adipic acid and nitric acid production.

221. The most effective and most frequently reported measures are those directed at F-gases and N_2O. Those aimed at CO_2 receive less attention.

222. The **ETSs** of Australia (repealed in July 2014) and the EU cover emissions from industrial processes. Since 2013 the EU ETS has covered CO_2 emissions from petrochemical, ammonia and aluminium production, N_2O emissions from the production of nitric, adipic and glyoxylic acid, and PFC emissions from aluminium production.

223. **Regulations** are used in Australia (Ozone Protection and Synthetic Greenhouse Gas Management Regulations, strengthened in 2010), the EU (directive on F-gases, with proposed strengthening in 2014; directive on mobile air-conditioning systems; and the industrial emissions directive) and Switzerland (Ordinance on Chemical Risk Reduction) to limit the manufacture, or to improve the manufacturing, handling, use and end-of-life recovery, of fluorine-containing gases used as substitutes for ODS. In Iceland, the management of PFC emissions from aluminium production is subject to permitting regulations. Japan encourages the use of blended cement in public construction projects (Green Purchasing Law).

224. **Voluntary enterprise partnerships** are used in the United States (Environmental Stewardship, HFC-23 Partnership and Mobile Air Conditioning Climate Protection Partnership) to: limit emissions of HFCs, PFCs and SF_6 from semiconductor production, electric power distribution and magnesium production; reduce PFC emissions from aluminium production; reduce trifluoromethane emissions from chlorodifluoromethane production; and improve the environmental performance of mobile air conditioners.

225. **Voluntary sectoral commitments** are used in a few instances to reduce emissions from industrial processes. An industry-led initiative seeks to reduce PFC emissions from aluminium production worldwide, and there are also national-level commitments in Netherlands (Low-PFC Aluminium Production), Norway (Climate Change Agreement with the aluminium industry), Spain and United States (Voluntary Aluminum Industrial Partnership). In France, l'Association des Entreprises pour la Réduction des Emissions de gaz à effet de Serre (AERES) N_2O agreements and regulations, and other agreements related to emissions from industrial processes, are used to reduce industrial N_2O emissions. There are also voluntary agreements in Belgium (on nitric acid production and caprolactam production), Netherlands (on adipic acid production), Norway (on adipic acid production) and Spain (on SF_6 emissions from the transmission and distribution of electricity).

226. The United States' Significant New Alternatives Policy is an **information** programme that identifies substitutes for chlorofluorocarbons, hydrochlorofluorocarbons and other ODS. The United States EPA has worked closely with industry to research,

identify and implement climate- and ozone-friendly alternatives, supporting a smooth transition to those new technologies.

227. **Fiscal incentives (taxes)** are used to reduce F-gas emissions in Denmark (imports of HFCs, PFCs and SF_6), Norway (imports and production of HFCs and PFCs) and Slovenia (HFCs, PFCs and SF_6).

228. **Research**, communication and cooperation and deals with sectors and stakeholders in support of the development and implementation of innovative reduction technologies are used in the Netherlands. Since 2009, the focus has been on the most significant sources: cooling (F-gases), industry (semiconductor industry and caprolactam production), sewage treatment facilities (CH_4 and N_2O), agriculture (CH_4 and N_2O), CHP engines (CH_4) and the monitoring of sources of non-CO_2 GHGs.

229. A **package of** multiple **policy types** (law/standard, taxation, budget/subsidy, technology development, awareness raising, education and voluntary agreements) is used by Japan in its Holistic Policies to Reduce the Emissions of F-gases.

230. The PaMs directed at industrial processes reported in the NC6s and BR1s were generally the same as those reported in the NC5s. The most significant changes were the inclusion of emissions from industrial processes in the EU ETS, Australia's ETS (repealed in July 2014) and the proposed revision of the EU directive on F-gases to limit the use of F-gases in new equipment, which would limit the total amount of HFCs that can be sold in the EU stepwise in order to reach one fifth of current sales by 2030.

4. Waste

231. Parties reported the continued use of their previous framework targets, regulations, fiscal incentives, voluntary enterprise partnerships, and public facilities, infrastructure and resource management to reduce CH_4 emissions via:

(a) Waste minimization through reduced packaging and increased product and packaging reusability and recyclability;

(b) Waste reuse through the implementation of waste separation and recycling;

(c) Minimization of landfill waste through processing and incineration;

(d) Landfill management with CH_4 capture or flaring.

232. Australia's **ETS** (repealed in July 2014) covered emissions from waste.

233. The EU uses **framework targets** and **regulations** to pursue the following objectives:

(a) The EU landfill directive mandates (regulation) waste acceptance procedures and technical configurations of landfills and sets targets (a 25 per cent reduction by 2006, a 50 per cent reduction by 2009 and a 65 per cent reduction by 2016 compared with the 1995 level) for the reduction of the amount of biodegradable municipal waste deposited in landfills;

(b) The EU waste packaging directive set targets to recover or incinerate with energy recovery at least 60 per cent (by weight) of packaging waste at waste incineration plants and to recycle 55 to 80 per cent (by weight) of packaging waste by 2008;

(c) The EU WEEE directive prescribes (regulation) extended producer responsibilities and includes the target that by 31 December 2006 EU member States should have been achieving separate collection rates of at least 4 kg/capita/year of WEEE from private households, to be taken for reuse or recycling;

(d) The EU end-of-life vehicles directive regulates (mandates) the acceptance and recovery of used vehicles by their producers.

234. To meet the targets of the EU landfill directive, EU member States are using: **fiscal incentives** (landfill taxes and price support for electricity from waste incineration); **regulations** (landfill quotas and tradable tipping certificates in the United Kingdom; waste acceptance standards; green certificates for electricity from waste incineration; and operating permits for landfills and compliance enforcement, including the closure of illegal sites); and **public infrastructure and resource management** (construction of collection facilities, incinerators and municipal waste treatment plants). To meet the EU waste packaging targets, EU member States are using **fiscal incentives** (deposit-return systems) and **regulations** (producer-responsibility schemes). To meet the targets of the EU WEEE directive, EU member States are using **regulations** (producer responsibility for taking back products from collection facilities), **public infrastructure and resource management** (to establish public collection facilities) and **fiscal incentives** (visible fees to fund the collection and management of older waste).

235. **Landfill regulations** are used in New Zealand and United States. The New Zealand National Environmental Standard for Landfill requires landfills with a lifetime design capacity exceeding 1 Mt and a current stock capacity of 200,000 t to collect and destroy landfill gas (CH_4). The United States Stringent Landfill Rule requires large landfills to capture and combust their landfill gas emissions.

236. Switzerland uses **regulations** (CO_2 ordinance) to require municipal solid waste incinerator (MSWI) plants to participate in the ETS or commit, along with all other MWSI plants, to meet CO_2 emission reduction goals.

237. **Voluntary enterprise partnerships** are used in Japan and United States. In Japan, in addition to more traditional recycling measures, the Government is encouraging manufacturers to improve the durability of, and enhance the repair system for, their products. In the United States, the Landfill Methane Outreach Program seeks to reduce GHG emissions from landfills by supporting the recovery and use of landfill gas for energy. It focuses its efforts on smaller landfills not required to collect and combust their landfill gas, as well as on larger, regulated operations that are combusting their gas but not using it as a clean energy source. The programme works with landfill owners and operators, state energy and environmental agencies, utilities and other energy suppliers, corporations, industry and other stakeholders to overcome the barriers to promoting cost-effective landfill gas energy projects. The United States WasteWise programme works with organizations to reduce solid waste through voluntary waste reduction activities.

238. A **package of multiple policy types** (taxation, budget/subsidy, law/standard, technology development and awareness raising) is used by Japan to promote recycling (waste minimization) and to upgrade combustion technologies at general waste and sewage sludge incineration facilities.

239. The PaMs directed at the waste sector reported in the NC6s and BR1s were generally the same as those reported in the NC5s. The most significant changes concerned:

(a) Australia's ETS (repealed in 2014), which covered emissions from waste generated after July 2012;

(b) Switzerland, which has new **regulations** (CO_2 ordinance) that set forth CO_2 emission requirements for MSWI plants.

5. Agriculture

240. Parties reported relatively few PaMs aimed at the agriculture sector. They reported the continued use of their previous **fiscal incentives (either directly or within the context**

of agricultural market reform) and regulations, as well as a new (first reported in the NC6s and BR1s) **carbon offset programme**:

(a) To reduce N_2O emissions through manure management;

(b) To reduce N_2O emissions through optimized use of nitrogen fertilizer;

(c) To reduce CH_4 emissions through changes in livestock management.

241. In the EU, **fiscal incentives** (i.e. subsidies and production quotas under the Common Agricultural Policy (CAP)) are the principal instrument used to pursue the above-listed objectives. For the most part, however, the primary purposes of its policies are to achieve economic efficiency and to improve the environmental quality of water and soil. The new CAP (covering 2014–2020) aims to further enhance the existing policy framework for the sustainable management of natural resources, contributing to both climate change mitigation and enhancing the resilience of farming to the threats posed by climate change and variability.

242. **Fiscal incentives** are also used in the United States (the Environmental Quality Incentives Program) in the form of innovation grants to livestock producers and owners of working farmlands to accelerate the development, transfer and adoption of innovative technologies and approaches, including those that deliver GHG-related benefits and improve the quality of nutrient management systems.

243. In addition, the EU nitrates directive (**regulation**) seeks to prevent water pollution caused by N_2O originating from the excessive use of agricultural fertilizers and from agricultural waste. The reduction of N_2O in soils also has climate change mitigation related benefits.

244. Other more climate-focused policies include **voluntary enterprise partnerships** which promote the reduction of GHG emissions at farms in Canada and United States, **long-term R&D** in Australia and the use of **models and demonstrations** in New Zealand.

245. The PaMs directed at agriculture reported in the NC6s and BR1s were generally the same as those reported in the NC5s. The most significant changes concerned:

(a) Australia's CFI, a voluntary **emission offset scheme** introduced in 2011 (see para. 134 above). In Australia, the land sector is excluded from carbon price (ETS) obligations. Farmers are exempt from paying a carbon price for emissions from livestock, soils or fertilizer use. At the same time, farmers and land managers who use their skills, experience and knowledge of the land to lower carbon pollution have opportunities under the ETS to be rewarded for their efforts. Around AUD 1 billion of carbon revenue is being reinvested in the land sector to help its transition to a low-carbon future;

(b) Belarus's State Program on Mitigation Actions in 2013–2020, which includes: measures, aimed at the agriculture, forestry/LULUCF and cross-cutting sectors, for systematic observation, climate change mitigation and adaptation; the scientific and information-based support of the implementation of such measures; and international cooperation on climate change.

6. Land use, land-use change and forestry

246. For some Parties the LULUCF sector makes a **sizeable contribution to their overall emission reductions**, such as Ukraine (the increase in removals from LULUCF accounted for 38.7 per cent of its total emission reductions during the period 2008–2012), Austria (36.8 per cent), Slovakia (25.8 per cent), Iceland (21.6 per cent), Czech Republic (20.8 per cent), Switzerland (13.8 per cent), Poland (12.5 per cent) and Luxembourg (10.6 per cent). As for agriculture, Parties reported relatively few PaMs aimed at the LULUCF sector. The measures tend to be part of larger policy strategies aimed at rural

development, agricultural reform, environmental stewardship and biodiversity, rather than being solely climate focused.

247. Parties reported the continued use of their previous fiscal measures (subsidies) and regulations (environmental codes) for private land, and public infrastructure and resource management rules and procedures for public land:

(a) To promote sustainable forest management, taking into account the need to enhance GHG removals through forest sinks and to maintain and enhance biodiversity;

(b) To prevent forest fires;

(c) To afforest, reforest and manage forests, grassland, wetlands and cropland;

(d) To increase green urban areas.

248. The EU Forestry Strategy provides for **fiscal incentives** (grants) and **public infrastructure and** resource **management** (public land management schemes). The EU CAP market and rural development policies provide fiscal incentives for actions that affect sinks in agricultural soils.

249. **Fiscal incentives** are also used in the United States, in the form of assistance to farmers to convert highly-erodible cropland or other environmentally sensitive acreage to native grasses, wildlife plantings, trees, filter strips and riparian buffers. In Australia, grants are given for cost-effective abatement opportunities.

250. Numerous **regulations, fiscal incentives and information dissemination programmes** are used in Australia to reduce land-use change related emissions from clearing native vegetation in Queensland and New South Wales. Slovakia uses regulations for sustainable forest management.

251. The Russian Federation adopted in 2012 a government programme on developing the forestry sector for the period 2013–2020, aimed at balancing forest use with reforestation and forest protection activities. The programme prioritizes the importance of afforestation of non-forest lands and the establishment of sustainable forest landscapes in sparsely forested and non-forested areas as important adaptation measures, contributing also to CO_2 absorption.

252. The PaMs directed at the LULUCF sector reported in the NC6s and BR1s were generally the same as those reported in the NC5s. The most significant changes concerned:

(a) Australia's CFI (see para. 134 above);

(b) Belarus's State Program on Mitigation Actions in 2013–2020 (see para. 245 above);

(c) Switzerland's Forest Policy 2020, which formulates provisions for the optimal coordination of the ecological, economic and social demands on the forest. It defines a total of 11 policy objectives, concerning wood harvesting potential, climate change, protective forest, biodiversity, forest area, the economic efficiency of the forestry sector, forest soil (including drinking water and tree vitality), protection against harmful organisms, the forest–wildlife balance, the leisure-related and recreational use of forests, and education and research (including knowledge transfer). The Forest Policy 2020 formulates several strategic guidelines and various measures for each objective;

(d) The United Kingdom's Grown in Britain industry-led action plan, which aspires to encourage businesses to invest in woodland creation and sustainable forest management practices.

G. Assessment of the economic and social consequences of response measures

253. In accordance with the UNFCCC reporting guidelines on BRs, each Annex I Party is encouraged to provide, to the extent possible, detailed information on the assessment of the economic and social consequences of response measures.

254. Several Parties (e.g. Belgium, EU, France, Greece, New Zealand and Norway) provided information in their BR1s on the assessment of the economic and social consequences of response measures. Some Parties reported ways in which they minimize the adverse effects of the implementation of PaMs, which is related to, but distinct from, the assessment of the economic and social consequences of PaMs. Some Parties made a reference to their reporting, in their NC6s, on ways to minimize the adverse effects of the implementation of PaMs under Article 2, paragraph 3, of the Kyoto Protocol.

255. EU, Greece, New Zealand and Norway described their procedures for the assessment of the impacts of proposed legislation or other policy initiatives. The EU, for example, provided a detailed description of its impact assessment system, which "addresses all significant economic, social and environmental impacts of possible new initiatives", including all legislative proposals and also other initiatives likely to have far-reaching impacts. The EU reported that all affected stakeholders should be engaged in every impact assessment, that existing international policy dialogues are used to keep third countries informed and that all impact assessments are published online.

256. Some Parties noted that PaMs may have both positive as well as negative economic and social effects. Belgium and France both cited the example of increased use of biofuels, which can result in increased economic activity in developing countries that export biofuels but can also have possible negative effects on food supply. France provided a table presenting the expected direct and indirect social and economic effects on developing countries resulting from eight of its most important PaMs, highlighting which effects are expected to be positive and which negative.

VII. Provision of financial, technological and capacity-building support to developing country Parties

A. Introduction

257. In accordance with section VIII of the UNFCCC reporting guidelines on NCs, Parties included in Annex II to the Convention (Annex II Parties) are required to provide details of measures taken to give effect to their commitments under Article 4, paragraphs 3, 4 and 5, of the Convention. Furthermore, according to section VI of the UNFCCC reporting guidelines on BRs, Annex II Parties were required, for the first time in 2014, to provide information on their provision of financial, technological and capacity-building support to Parties not included in Annex I to the Convention (non-Annex I Parties), consistent with the requirements of the UNFCCC reporting guidelines on NCs following the common reporting format.

258. By decision 19/CP.18, the Conference of the Parties (COP) adopted the common tabular format for the UNFCCC reporting guidelines on BRs for developed country Parties, contained in the annex to that decision. With regard to financial support, three tables are of relevance: CTF table 7 for summary information on the provision of public support for a given year; CTF table 7(a) for information on the provision of public financial support via contributions through multilateral channels for a given year; and CTF table 7(b) for

information on the provision of public financial support via contributions through bilateral, regional and other channels in a given year. In CTF tables 7(a) and (b), Parties are also to provide an indication of what "new and additional" financial resources they have provided and to clarify how they have determined that such resources are "new and additional". With regard to technology and capacity-building, table 8 of the UNFCCC reporting guidelines on BRs provides a common tabular format for the reporting of the provision of support for technology development and transfer and table 9 for the reporting of the provision of capacity-building support.

259. Although the information provided in line with the UNFCCC reporting guidelines on BRs has to be consistent with that provided in the national communications (NCs), the reporting requirements for BRs are more detailed and refined in comparison with the requirements for NCs. On that basis, Annex II Parties are requested to provide more detailed information, inter alia, on methodological issues, the respective reporting format used and definitional issues.[37]

260. With regard to the reporting of technological support, there are also observed differences in the reporting requirements for NCs and BRs. In CTF table 8 Parties are requested to: provide a clear indication of the targeted area of the technology activity (mitigation, adaptation or both); note the source of funding and the actor that undertakes the activity (public, private or both); and note the status of the activity (implemented or planned). The UNFCCC reporting guidelines on NCs, meanwhile, suggest including information on the years in operation of the technology activity, the factors that led to the project's success, the type of technology transferred and the impact on GHG emissions or removals.

261. Regarding capacity-building, the UNFCCC reporting guidelines on BRs request Annex II Parties to report such information in a textual and a tabular format, whereas the UNFCCC reporting guidelines on NCs refer to capacity-building as part of a list of practices and processes related to 'soft' technologies.

B. Financial resources

1. Overview of financial resources provided

262. Annex II Parties provided quantitative as well as qualitative information in their NC6s and BR1s in accordance with the respective reporting guidelines. The information provided refers to adaptation and mitigation activities that were supported by them, including support directed towards clean energy, energy efficiency, forestry, sustainable landscapes, land use, transport, capacity-building and REDD-plus,[38] making use of multilateral and bilateral channels. Furthermore, some specific issues were addressed by one or a few Parties, including: the use of specific instruments, such as development finance and export credits; the importance of addressing financing for high-carbon forms of energy; gender as a central issue with regard to climate change mitigation and adaptation; and support provided relating to response measures, and support that was provided specifically to civil-society organizations and related activities (see box 6). Many Annex II Parties reported activities undertaken in the context of the fast-start finance period, which

[37] With regards to finance, this includes, inter alia, an explanation of how the Party defines funds as being climate specific, the Party's approach to tracking the provision of support, and information on private financial flows leveraged by bilateral climate finance towards mitigation and adaptation activities in non-Annex I Parties, including PaMs that promote the scaling up of private investment.

[38] Policy approaches and positive incentives on issues relating to reducing emissions from deforestation and forest degradation in developing countries; and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries.

spanned from 2010 to 2012,[39] indicating that the collective commitment had been met.[40] Annex II Parties provided information on support directed primarily at mitigation and cross-cutting activities, but also increasingly towards adaptation activities.

263. **The identification of clear trends** and patterns in the provision of financial resources as compared with the data provided in the NC5s **is very difficult owing to the numerous reporting issues**. However, the information provided in the NC6s and BR1s suggests that Annex II Parties continue to make prominent use of multilateral and bilateral channels in the provision of financial resources for the implementation of the Convention, with a significant **increase in funds provided through bilateral channels in comparison with in the previous** reporting **period**. There have been **increases in funding directed towards adaptation**, as well as funding targeting the **energy and forestry** sectors, including **REDD**-plus; capacity-building and cross-cutting activities; and to funds other than the Convention funds that are relevant to climate change mitigation and adaptation. In general, the information contained in the BR1s suggests that the predominant funding source is official development assistance (ODA). Furthermore, it suggests that Annex II Parties mainly used grants as a financial instrument, with concessional loans, equity and non-concessional loans being the minority instruments utilized. The greater part of the funding reported on was marked as "provided" and as climate-specific contributions. Many Parties provided information either in USD or in both USD and their domestic currency. However, various Parties provided information exclusively in their domestic currency.

264. Furthermore, Annex II Parties reported a continued provision of funding to the Global Environment Facility (GEF), although the sum of the amounts reported by Annex II Parties in their NC6s is lower than that reported in the NC5s. However, the sum of Annex II Parties' reported contributions to the Least Developed Countries Fund (LDCF) and the Special Climate Change Fund (SCCF) in the NC6s is higher than the sum of the reported amounts in the NC5s. In addition, Annex II Parties' reporting indicates a continued provision of funds to the Adaptation Fund and they have started to report on funds provided to the Green Climate Fund (GCF).

265. Annex II Parties reported financial contributions to multilateral institutions, the sum of which is slightly lower than the sum reported in the NC5s. The sum of the reported amounts of support provided to multilateral development banks (such as the African Development Bank and Inter-American Development Bank), however, is higher, in some cases significantly, than the sum of the contributions reported in the NC5s.

266. A few Annex II Parties provided specific information on their financial contributions to **Climate Investment Funds (CIFs)** such as the Clean Technology Fund. The preference, identified in the NC5s, for channelling financial resources through funds that are not necessarily under the Convention has continued to manifest itself.

267. Several Annex II Parties provided information on the **regional distribution of their support and** their **prioritized allocation to the most vulnerable developing countries**.

[39] At COP 15, developed countries pledged to provide new and additional resources, including for forestry and investments, approaching USD 30 billion for the period 2010–2012 and with a balanced allocation between mitigation and adaptation. That collective commitment has come to be known as fast-start finance. Following up on that pledge, COP 16 took note of the collective commitment and reaffirmed that funding for adaptation would be prioritized for the most vulnerable developing countries, such as the least developed countries, small island developing States and African countries. Furthermore, the COP invited developed country Parties to submit information on the resources provided by them to achieve the goal, including ways in which developing country Parties could access the resources, by May 2011, 2012 and 2013.

[40] More information, including all information provided by developed country Parties, is available at <http://unfccc.int/5646.php>.

such as the least developed countries (LDCs), small island developing States (SIDS) and African countries.

268. With regard to **qualitative information**, many Annex II Parties provided descriptions of the programmes, projects, initiatives supported by them or actions taken in the area of climate change, including signature initiatives. Many Parties also provided qualitative information in line with the UNFCCC reporting guidelines on NCs and on BRs, for example on private finance. With regard to **quantitative information**, most Annex II Parties provided information on multilateral and bilateral contributions, based on the UNFCCC reporting guidelines on NCs and on BRs. However, there was no common approach adopted by Annex II Parties for providing data.[41]

Box 6

Support provided to civil society

Denmark provided information on its contributions specifically to international environmental organizations and other international non-governmental organizations (NGOs) relevant to the implementation of the Convention in the period 2009–2012, including to the International Union for Conservation of Nature, the International Institute for Environment and Development, the World Wildlife Fund, the International Institute for Sustainable Development, the International Work Group for Indigenous Affairs and the World Resources Institute.

The Netherlands provided information on a special programme with the Dutch NGO sector, which is supporting a total of 20 alliances with EUR 2 billion during the period 2010–2016, of which 11 alliances contribute partially or fully to climate change adaptation or mitigation objectives.

Sweden provided information on its cooperation with civil society in the area of climate change, including, inter alia, with the Stockholm Environment Institute, an independent international research institute. Such cooperation is important because the actors often focus on the local level and work directly with the people who are most vulnerable to and suffer most as a result of the impacts of climate change.

Australia has supported a programme of volunteers and fellowships that have assisted developing countries' efforts to adapt to and mitigate climate change.

2. Reporting issues

269. While the UNFCCC reporting guidelines on both NCs and BRs require consistent reporting of information on financial support, the reporting requirements for BRs differ from those for NCs in that the former are more detailed and stringent. One of the main findings from the information provided in the NC6s and BR1s is that Parties accordingly used different approaches with regard to the submission of information in both reports. While some Parties provided two separate reports with different information in each, other Parties provided only one document covering both the BR1 and the NC6. Hence, there was no common approach taken by Parties as to where to incorporate the information requested by the two sets of reporting guidelines, with some information, although required by the UNFCCC reporting guidelines on BRs, being contained only in the NC6. This greatly complicates, and in some cases hinders, the assessment of the reported information.

[41] All quantitative information retrieved from the NC6s and BR1s will be made available in the national communications module of the UNFCCC climate finance data portal and in the newly developed biennial reports module of the portal in due course (see <http://www.unfccc.int/financeportal>). The information contained in the BR1s is also available in the Biennial Reports Data Interface (BR-DI) at <http://www4.unfccc.int/sites/br-di/Pages/Home.aspx>.

270. The following are examples of observed discrepancies in Parties' reporting of climate finance data between their CTF tables, BR1 and NC6 and across Parties:

(a) Differences in sectoral attribution;

(b) Different amounts reported for the same type of support/activity;

(c) Differences in the number of digits reported for the amounts;

(d) Different currencies reported in the BR1 from in the NC6, with no provision of the exchange rates used;

(e) Differences in reporting periods and in the use of calendar versus fiscal year;

(f) Differences between reported contributions to multilateral institutions, which may be due to the differentiation between core/general contributions versus climate-specific contributions in the BR1, and which were sometimes not clearly defined in the NC6;

(g) Differences in the status of the funds reported on (i.e. whether the specific amount reported on was pledged, committed or in fact provided/disbursed), as in some cases such information was not provided in the NC6;

(h) In a few cases, some amounts were missing from one report but provided in the other. In a few instances, there was also a duplication of specific data entries in the CTF tables;

(i) The comparison of the data provided by Parties in their NCs is complicated by some countries providing information not required by the UNFCCC reporting guidelines on NCs.

271. The discrepancies outlined above make it difficult, and in some cases not possible, to aggregate the amounts provided by Parties in their NC6s and BR1s. In addition, great care must be taken when comparing amounts reported for different years or reporting periods since they may not constitute amounts reported by the same set or number of Annex II Parties. Consequently, in light of the different reporting requirements, the financial data provided by Annex II Parties in their NC6s and BR1s are presented separately in this report. Furthermore, since some Annex II Parties did not provide their information in United States dollars, the financial data provided in national currency has been converted to United States dollars using exchange rates from the data set of financial indicators of the Organisation for Economic Co-operation and Development (OECD)[42] for the relevant years. For Parties providing information on a fiscal year basis, the relevant timespan of the respective fiscal year was taken into account when converting the relevant data into United States dollars. As a result of these reporting issues, the amounts presented in this chapter may not represent the total amount of the climate finance actually provided in response to Annex II Parties' obligations under the Convention within the reporting period.

3. Developments in climate finance since the fifth national communications

272. Since the submission of the NC5s at the beginning of 2010, new developments have occurred with regard to climate finance, including the measurement, reporting and verification (MRV) of support under the Convention (see para. 277 below), which may have influenced the information provided by Annex II Parties. Such developments include the conclusion of the **fast-start finance period**, with developed country Parties having submitted 30 reports in total on the resources provided by them to fulfil the commitment

[42] The relevant exchange rates for the respective reporting period were obtained from <http://stats.oecd.org/index.aspx?queryid=169>.

referred to in paragraph 95 of decision 1/CP.16.[43] Other developments are also reflected partly in the information provided by Annex II Parties in their NC 6s and BR1s.

273. COP 16 recognized that developed country Parties had committed, in the context of meaningful mitigation actions and transparency on implementation, to a goal of mobilizing jointly **USD 100 billion per year by 2020** to address the needs of developing countries, and decided that a significant share of new multilateral funding for adaptation should flow through the GCF.[44] COP 18 called on developed country Parties to channel a substantial share of public funds to adaptation activities and encouraged developed country Parties to further increase their efforts to provide resources of at least to the average annual level of the fast-start finance period for 2013–2015.[45] COP 19 urged developed country Parties to maintain the continuity of the mobilization of public climate finance at increasing levels from the fast-start finance period in line with the USD 100 billion goal.[46]

274. With regard to **long-term finance**,[47] COP 19 requested developed country Parties to prepare biennial submissions on their updated strategies and approaches for scaling up climate finance from 2014 to 2020, including any available information on quantitative and qualitative elements of a pathway.[48] In addition, COP 19 decided to continue its deliberations on long-term finance and requested the secretariat to organize in-session workshops on various issues.[49] Furthermore, the COP decided to convene a biennial high-level ministerial dialogue on climate finance, starting in 2014 and ending in 2020.[50]

275. COP 19 stressed the need to achieve the full operationalization of the **GCF** and called for ambitious and timely contributions to be made by developed countries to enable an effective operationalization. Furthermore, it underlined that initial resource mobilization should reach a very significant scale and invited financial inputs from a variety of other sources, public and private, including alternative sources, for the initial resource mobilization process.[51] At its 7th meeting, the Board of the GCF decided that the eight essential requirements for the GCF to receive, manage, programme and disburse financial resources had been met. Therefore, it decided to commence the process to mobilize resources commensurate with the ambition of the GCF to promote the paradigm shift towards low-emission and climate-resilient development pathways by providing support to developing countries to limit or reduce their GHG emissions and to adapt to the impacts of climate change.[52] In their reports, various Annex II Parties included information on funds provided to the GCF.

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[43] All information regarding submissions, information documents, updates and fast-start finance side events is available at <http://unfccc.int/5646.php>. Three information documents were issued by the secretariat based on those submissions and the information contained in the submissions has been incorporated into the UNFCCC climate finance data portal.

[44] Decision 1/CP.16, paragraphs 98 and 100.

[45] Decision 1/CP.18, paragraphs 65 and 68.

[46] Decision 3/CP.19, paragraph 7.

[47] More information on the issue of long-term finance, including the archive of the work programme on long-term finance in 2012 and the extended work programme on long-term finance in 2013, is available at <http://unfccc.int/6814.php>.

[48] Decision 3/CP.19, paragraph 10. This includes information: (a) to increase clarity on the expected levels of climate finance mobilized from different sources; (b) on Parties' policies, programmes and priorities; (c) on actions and plans to mobilize additional finance; (d) on how Parties are ensuring a balance between adaptation and mitigation financing, in particular with regard to the needs of developing countries that are particularly vulnerable to the adverse effects of climate change; and (e) on steps taken to enhance their enabling environments.

[49] Decision 3/CP.19, paragraph 12.

[50] Decision 3/CP.19, paragraph 13.

[51] Decision 4/CP.19, paragraphs 11, 13, 14 and 15.

[52] Decision B.07/09 of the Board of the GCF.

276. The **GEF** has achieved two important milestones since the submission of the NC 5s: the conclusion of its fifth replenishment (GEF 5) and the finalization of the process for its sixth replenishment, whereby donor countries have pledged USD 4.43 billion to the GEF Trust Fund[53] over the period 2014–2018. Highlights of GEF 5 include the establishment of a System for Transparent Allocation of Resources, aimed at enhancing the predictability of funding for recipient countries through ex-ante repartition of funding within and among focal areas on the basis of a formula,[54] as well as enhanced action on mitigation and reporting undertaken by developing countries through the climate change focal area of the GEF, which accounted for 32 per cent of the Trust Fund under GEF 5.[55] Annex II Parties reported on their contributions to GEF 5 in their NC 6s.

277. COP 17 established the **Standing Committee on Finance (SCF)** to assist the COP in exercising its functions with respect to the financial mechanism of the Convention in terms of, inter alia, MRV of the support provided to developing countries. One of the activities of the SCF in that regard is the preparation of a biennial assessment and overview of climate finance flows (BA).[56] In preparing the BA, the SCF was requested to consider ways of strengthening methodologies for reporting climate finance,[57] to consider ongoing technical work on operational definitions of climate finance, including private finance mobilized by public interventions, and to assess how adaptation and mitigations needs can be met most effectively by climate finance.[58] Additionally, the SCF was invited to consider ways to increase its work on MRV of support beyond the BA.[59] The first BA has been finalized and the summary and recommendations by the SCF on the 2014 BA are included in the report of the SCF to COP 20.[60]

4. Main features of climate finance information and related methodological issues

278. Annex II Parties provided extensive qualitative information, both in response to the UNFCCC reporting guidelines on NCs and those on BRs, as well as beyond the information required to also reflect the recent developments in the UNFCCC process on climate finance. For example, some Annex II Parties provided information on their overall approach to, and setting of priorities with regard to, climate finance. As there was no common approach taken to delivering the respective information (i.e. no clear distinction between NC-related qualitative information and BR-related qualitative information), no such distinction has been made between the qualitative information provided in this report. Rather, it is to be seen as a synthesized conglomeration of all of the qualitative information provided by Annex II Parties.

"New and additional"

279. While most Annex II Parties stated that funds provided were "new and additional" pursuant to Article 4, paragraph 4, of the Convention, not all Parties provided information on how they determined that such funds are indeed "new and additional". Many Parties

[53] As approved by the fifth GEF Assembly, see <http://www.thegef.org/gef/outcomes-fifth-assembly>.
[54] More information is available at <http://www.thegef.org/gef/sites/thegef.org/files/eventfiles/6-GEFSTARUpdate.pdf>.
[55] See <http://www.thegef.org/gef/sites/thegef.org/files/eventfiles/1-InstitutionalStructureOfTheGEF-2013.pdf>.
[56] Decision 2/CP.17, paragraph 121(f). The BA is to include information on the geographical and thematic balance of such flows, drawing on available sources of information, including national communications and biennial reports of both developed and developing country Parties. More information on the BA is available at <http://unfccc.int/8034.php>.
[57] Decision 5/CP.18, paragraph 11.
[58] Decision 3/CP.19, paragraph 11.
[59] Decision 7/CP.19, paragraph 9.
[60] FCCC/CP/2014/5.

highlighted this issue in the context of the fulfilment of their fast-start finance commitment, and a few Parties also made reference to the economic difficulties that they had faced during the reporting period. In accordance with the common reporting format for BRs, Parties are required to fill in a box referring to CTF table 7, which is to include an indication of what "new and additional" financial resources have been provided and a clarification of how the Party determined that such resources are "new and additional" in relation to the information provided in CTF tables 7(a) and 7(b). Not all Parties provided the required information in the corresponding CTF text box, but some provided information in the textual part of their BR1s or NC6s.

280. As many Annex II Parties noted that there is **no internationally agreed definition of what counts as "new and additional" climate finance**, they provided information on the approaches that they took to prove that the funds provided were indeed "new and additional".

281. Several Annex II Parties, such as Belgium, Denmark, Finland, Luxembourg, Netherlands, Norway, Sweden, Switzerland and United Kingdom, reported that **climate finance provided as** part **of their ODA was beyond the United Nations target of 0.7 per cent of gross national income and/or part of increased ODA**, that it was not diverted from other priorities and that, therefore, it can be considered to be "new and additional". For example, the Netherlands indicated that the determination of "new and additional" funds provided during the fast-start finance period was determined at the budget/input level and that that period triggered a renewed focus on climate in all ODA programming. Iceland reported the creation of a separate item that was included in the international and development cooperation state budget as of 2012.

282. While Belgium indicated that additional resources made available for the fast-start finance period were over and above the budgeted measures, other Annex II Parties, such as EU, Germany, Iceland and Japan, identified that the climate finance that they reported represented **newly committed or disbursed funds**, stating that previously committed or disbursed climate finance was not included in their reports (for example, the EU stated that the resources were committed after, and not included in, its NC5).

283. Other Annex II Parties made reference to the **Copenhagen Accord** and pledges made therein using climate finance prior to 2009 as a baseline. In particular: Canada reported that its funding was "new and additional" because it was above and beyond what was planned prior to the Copenhagen Accord; Finland decided to use 2009 as the baseline for the definition of "new and additional"; and Germany defined the additionality of its fast-start finance pledge as the funds representing an increase over climate-related funds in 2009 and coming from an innovative source of finance, such as revenues from emissions trading.

284. Further examples include: the United Kingdom reporting on a new budget allocation by its Government for the financial years 2011/2012 to 2014/2015 in the form of the International Climate Fund, from which fast-start finance activities were also funded; and Austria stating that it counts as "new and additional" all climate finance resources that underpin a gradual and substantial scaling up of climate finance over the years since the Convention and its Kyoto Protocol entered into force.

Private finance

285. In accordance with the UNFCCC reporting guidelines on BRs, Annex II Parties are encouraged to report, to the extent possible, on private financial flows. Accordingly, many Annex II Parties provided information on **private finance**, highlighting its key role in the context of climate finance, but at the same time underlining the importance of public climate finance. To that end, individual Parties pointed out the following: the enabling role of public resources in leveraging private investment, especially with regard to adaptation

strategies; that most cooperation with the private sector includes an element of technology transfer; and the opportunity to test new and innovative approaches for mobilizing private climate finance that are replicable and scalable.

286. Some Annex II Parties also provided information on their **efforts to mobilize private investments** by leveraging public climate finance. Examples include information on: trade insurances; a regional blending mechanism including direct grants, technical assistance, interest rate subsidies, risk capital and guarantees; loans that link grant aid with market finance; environmental loans; and direct advisory services. Furthermore, some Parties reported on their provision of support to multilateral financial institutions, such as CIFs, whereby additional finance from the private sector and multilateral development banks was leveraged, and the Clean Technology Fund, which catalyses clean energy investments. Other examples include support provided by the Nordic Development Fund, which facilitates the exchange of technology, know-how and innovative ideas between Nordic countries and low-income countries in the area of climate change.

287. Many Annex II Parties reported on a wide range of **measures to encourage private-sector investments**, including through the: financing of and investing in profitable private-sector projects; provision of concessional credits to private exporters; provision of long-term risk capital; and issuance of partial credit guarantees. With regard to mechanisms, the use of guarantee mechanisms, equity investments and other types of innovative financing was mentioned, as were risk-sharing mechanisms and the leveraging of significant private-sector investments, such as through the establishment of a mechanism. With regard to instruments, the promotion of new forms of private-sector finance, such as sovereign wealth funds and pension funds, and the use of different commercial instruments for providing assistance to developing countries through the private sector were mentioned by some Parties. Institutional measures reported on include the establishment of: a foundation for large-scale investments; a fund to mobilize private capital for climate-relevant investments; and facilities in multilateral financial institutions targeting the mobilization of climate-friendly private-sector investment in developing countries. Other measures reported on include: the promotion of business-to-business partnerships in relation to environmentally sound technologies; capacity-building activities to enhance countries' private financial enabling environments, including improving the understanding of private finance; and efforts to develop harmonized regulatory practices.

288. As per the UNFCCC reporting guidelines on BRs, information was also provided in the context of the requirement to report on **PaMs that promote the scaling up of private investment** in mitigation and adaptation activities in developing country Parties. However, one Party highlighted a number of barriers to facilitating sufficient private investment and its contribution to international efforts to better understand opportunities for mobilizing private investment. Another Party indicated that it is using its public finance to mobilize increased flows of private finance by helping to reduce barriers, correct existing market failures and create the right investment conditions.

289. A few Annex II Parties mentioned **difficulties in reporting on private finance flows** owing to the absence of mechanisms to track such flows, indicating that further work is necessary in that regard. Only one Annex II Party gave a rough estimate of the level of private funding leveraged, while another Party provided the total amount of private finance as at December 2012, with a caveat stating that the amount was not counted as part of the reported information on fast-start finance. Furthermore, another Party provided more detailed information on the approach taken by one of its development finance institutions to calculate private-sector investment leveraged. Another Party, owing to the long time lag between decision-making and the implementation and completion of a project, provided a list of projects decided upon and the funds that are expected to be mobilized, rather than the funds eventually mobilized in a specific transaction.

Methodological issues relating to tracking the provision of financial support

290. The UNFCCC reporting guidelines on BRs have introduced various methodological issues that Annex II Parties should provide information on in their BRs.

291. In response to the requirement to describe the methodology used for reporting finance-related information in their BR1s, some **Annex II Parties provided information on the methodologies used for tracking the provision of financial support**. While many Parties reported utilizing the OECD Development Assistance Committee (DAC) system of Rio markers, which has been integrated into their own monitoring and reporting system, only a few Parties provided information on their specific approach to applying the Rio markers for the preparation of their respective data, including how to address issues such as double counting. For example, one Party indicated that, as REDD-plus and renewable energy projects may also have an adaptation component, both the mitigation and adaptation markers were used, and that, for the information reported for the year 2012, the adaptation marker was also applied for disaster risk reduction assistance. However, one Party pointed out that the markers indicate the degree of relevance only ,nd that, therefore, the figures should be interpreted with caution as the lack of a clear distinction between main and significant objectives may lead to an overestimation of climate change funding.

292. A few Annex II Parties highlighted the joint climate finance tracking methodologies of multilateral development banks as an important step towards harmonizing existing reporting approaches. Furthermore, a few Parties provided information on the institutional settings in their respective countries with regard to the tracking of climate finance, as well as information on how that information was compiled. One such example outlines an inter-agency process to compile the data provided in the BR.

293. In terms of how Parties define funds as being climate specific, a few Annex II Parties provided an explanation of the figures provided in the context of contributions to multilateral institutions, including that: for core/general contributions to multilateral channels, data were collected as part of the OECD DAC reporting; core support refers to all unearmarked support to multilateral organizations; and core support is only taken into account when the organization itself can provide data on the exact thematic budget allocations. Other definitions provided by Parties of what constitutes climate-specific funding include: funds that aim at supporting activities conceived and funded specifically to achieve climate-related objectives, as well as those with co-benefits, including both adaptation and mitigation activities. Some Parties also specified that only the relevant fractions of programme budgets that actually supported climate objectives were reported, with bilateral contributions being defined by taking into consideration the total of the financing with climate-related co-benefits. However, one Party indicated that it is difficult to quantitatively specify the amount of contributions made for climate-specific purposes, as it considers that the decision taken by each institution to label the funds provided as climate specific is to some extent subjective.

294. With regard to the **methodologies used to specify the status of funds**, many Annex II Parties did not provide such information. Where Parties did provide such information, they used a wide range of different approaches. This includes, for example: the use of the OECD practice to specify the status of funds; the use of the term "committed" corresponding to funding decisions taken by the respective executive board; and the use of the term "provided" referring to funds that have been transferred from the government to a recipient Party.

295. In terms of the **methodologies used for currency conversion**, only some Parties specified such methodologies, including the reference date. A few Parties that did provide such information made reference to the OECD Annual Average Dollar Exchange Rates for DAC Members as the basis for their currency conversion. Regarding information on

financial support provided by sector, one Party provided detailed information on its sectoral attribution of projects on the basis of the type of support as identified in the CTF tables. However, another Party pointed out that the current common tabular format does not allow for an indication of the specific adaptation/mitigation ratio of cross-cutting contributions.

296. Overall, there was **no common approach in terms of the methodologies** used by Annex II Parties in defining and tracking climate finance from both a qualitative and a quantitative perspective. This further complicates the aggregation and comparison of the data provided and the activities reported on. In this context, one Party stressed the need for better guidance on what to include under financial support for adaptation, pointing out that it proves difficult at times to separate assistance for adaptation from more general development assistance or to identify adaptation components in REDD-plus or renewable energy projects.

Mitigation and adaptation needs

297. In accordance with the UNFCCC reporting guidelines on BRs, Annex II Parties are to describe how they seek to ensure that the resources provided by them **effectively address the needs of non-Annex I Parties with regard to climate change adaptation and mitigation**. Some Annex II Parties provided information on steps taken, including: applying the principles of the Paris Declaration on Aid Effectiveness; consulting partner countries during the project planning stage; the participation of developing country representatives in the decision-making processes of multilateral institutions; following a country-driven approach and promoting national ownership; establishing public–private partnerships, as well as development partnerships; ensuring that projects undertaken correspond to the partner country's needs and policy framework and address national priorities; supporting capacity-building to enable countries to develop their own climate change response plans and proposals to access climate finance; capacity-building efforts undertaken to support developing countries in developing national plans; and applying strategic planning in line with partner countries' needs.

Meeting the costs of adaptation

298. The UNFCCC reporting guidelines on NCs request Annex II Parties to provide detailed information on the assistance provided for the purpose of assisting developing country Parties that are particularly vulnerable to the adverse effects of climate change in meeting the costs of adaptation to those adverse effects. Information that was provided in that regard included contributions made to the SCCF, the LDCF, the Adaptation Fund, the Global Facility for Disaster Reduction and Recovery, the Consultative Group on International Agricultural Research, the Global Crop Diversity Trust, the Global Framework for Climate Services, the Global Climate Change Alliance (GCCA) and the Pilot Program for Climate Resilience, with, for example, Switzerland indicating that it had committed payments to the SCCF and the LDCF on the basis of an emissions-based burden-sharing formula.

299. In addition, many Annex II Parties highlighted that particularly vulnerable countries, especially in Africa, but also the LDCs and SIDS, had been prioritized in particular with regard to support for adaptation. Although one Party stated that, since there is no internationally agreed definition of which Parties would fall under that category, it is up to each Annex II Party to decide which countries to define as most vulnerable.

300. Relevant activities reported include: the identification and dissemination of adaptive strategies; support for the formulation of appropriate adaptation strategies and plans; the identification of priority adaptation measures; the provision of access to meteorological services as well as to data on weather and climate change impacts; capacity-building to assess and respond to risks associated with climate change and associated vulnerabilities; responding to needs and priorities identified by partners in bilateral agreements on the basis

of available vulnerability assessments; increasing understanding and awareness of the impacts of, and vulnerabilities to, climate change, including, for example, knowledge sharing, South–South learning processes and the forming of strategic partnerships and alliances; the 'climate proofing' of all bilateral development assistance; the strengthening of the private sector to take into account business risks and opportunities, and promoting and establishing cooperative activities with the private sector and academia in partner countries; and the provision of support for disaster risk reduction, ecosystem-based adaptation approaches, innovative insurance schemes and prevention activities.

301. A few Parties explicitly reported having scaled up their support for adaptation, including for national adaptation planning, disaster risk reduction, climate services and food security, as well as referring to steps taken to strengthen their support, such as the integration of adaptation considerations into existing and new development assistance programmes, for example on the basis of the OECD guidelines for the integration of climate change adaptation into development assistance, and the combination of adaptation and disaster risk reduction efforts.

Other matters

302. Most Annex II Parties specifically included information on **forest-related activities, including REDD-plus activities**. These included, for example, support provided to the United Nations' and World Bank's forest programmes, such as the United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries, the Forest Investment Programme and the Forest Carbon Partnership Facility, and research networks such as the International Centre for Research in Agroforestry, the Center for International Forestry Research and the International Union of Forest Research Organizations, as well as contributions to specific funds, such as the Congo Basin Forest Fund, the Guyana REDD+ Investment Fund and the Amazon Fund. Furthermore, forest-related activities included, inter alia: the advancement of global awareness and knowledge sharing; the preparation and implementation of national forest programmes and management plans as well as sector-specific policies and strategies; the improvement of developing countries' ability to overcome barriers to the advancement of REDD-plus; the encouragement of increased public and private investment in sustainable forestry and agriculture, including the facilitation of a dialogue on leveraging finance with the private sector; the provision of technical support; and increasing the understanding of drivers of deforestation. Other issues raised by some Parties include the importance of a participatory approach to forestry and the importance of partnerships between indigenous communities, civil-society organizations, government agencies and donors.

303. A few Annex II Parties highlighted the **mainstreaming of climate change** and integration of low-carbon development and climate resilience into their overall development assistance, with some Parties providing concrete information on strategies utilized, as well as the shifting of investment patterns towards climate-friendly activities as important aspects of their activities. The importance of partnerships, cooperation and coordination was pointed out by a few Annex II Parties. Furthermore, several Annex II Parties provided information on carbon markets, with, for example, one Party highlighting the continued importance of the CDM in the LDCs, while also indicating the importance of scaled-up market mechanisms.

304. Furthermore, a few Annex II Parties included information on the **effectiveness of climate finance**. Several issues were deemed essential by Parties in addressing the effectiveness of climate finance, including: the importance of the tracking and reporting of climate finance, including its effects; the critical role of partner countries in promoting and ensuring the effectiveness of climate finance; the need for compliance with guidance provided by the COP as well as the principles included in the Paris, Accra and Busan

Agenda to increase aid effectiveness; the importance of the establishment of a mechanism that ensures the effective use of public financing, including new and innovative schemes such as stand-by loans for disaster recovery and preferential terms for concessional loans; the importance of aligning investments with established national strategies and country development plans on the basis of broad consultations; and the integration of environmental and climate change objectives as a cross-cutting issue into all activities.

305. A few Annex II Parties provided forward-looking information on their climate finance activities, including reiterating their commitment to the goal of jointly mobilizing USD 100 billion per year by 2020 to address the needs of developing countries in the context of meaningful mitigation actions and transparency of implementation. Examples include the following:

(a) Japan stated that in 2013 it made a financial pledge of 1.6 trillion yen (about USD 16.39 billion) to assist developing countries in strengthening their 'partnerships' with various countries and stakeholders, which will be provided during the three-year period between 2013 and 2015, with the public financial contribution amounting to 1.3 trillion yen (about USD 13.32 billion);

(b) France reported that the French Development Agency has set a goal of allocating 50 per cent of its foreign investment and 30 per cent of the foreign investment of its private sector branch to climate change for the period 2012–2016. France also reported that it has adopted a new energy strategy, with the objective of achieving an allocation of EUR 2 billion over the next three years for renewable energy and energy efficiency projects in developing countries;

(c) The Netherlands provided information on having defined a specific target to provide environmentally friendly, modern energy supply by 2015 to 10 million people, which was achieved in 2012, and also reported on its plan to focus in the coming years more on leveraging international climate finance, in particular from the private sector, and demonstrating concrete results in terms of inclusive development and gender;

(d) Other examples are provided by the United Kingdom, which reported on a budget allocation introduced in 2010, which extends up to the financial year 2014/2015 and was further increased in 2013, as well as by New Zealand, which stated that it has confirmed that its post fast-start finance contribution will continue at a similar level, with the focus remaining on renewable energy and climate resilience in the Pacific.

5. Scale of and trends in multilateral and bilateral climate finance

Information retrieved from Annex II Parties' national communications on multilateral funding

306. As per the UNFCCC reporting guidelines on NCs, Annex II Parties provided information on their financial contributions to the GEF, including to the GEF Trust Fund, the SCCF and the LDCF. The information provided is quite varied, as Annex II Parties reported such information, inter alia, for a multi-year period, for several years on an annual basis or for the replenishment cycle of the GEF as a whole. In addition, some amounts provided for a period did not necessarily match the specific years of the reporting period, making the calculation of the total funds provided by Annex II Parties during the reporting period impossible, as the disaggregation of the amounts for a period with years outside of the reporting period could not be done. In addition, the figures included in the NC6s differ in some cases from the figures reported in the BR1s, as differences between core/general contributions and climate-specific contributions were not clearly identified by some Annex II Parties.

307. The figures presented in table 21 may not necessarily match those provided in official reports issued by the GEF secretariat or its Trust Fund, because the data reported by Annex II Parties in their NC6s may not be complete and comparable, for the reasons cited in paragraphs 269–271; and because of the difference in the statuses of the funds reported on (i.e. whether the reported amount was for example pledged, provided or disbursed).

Table 21

Financial contributions reported by Annex II Parties to funds under the management of the Global Environment Facility[a]

(Millions of United States dollars)

Fund	*2009*	*2010*	*2011*	*2012*	*Other year range within the reporting period*	*Unspecified*	*Total*
GEF Trust Fund	142.29	249.57	400.67	371.52	641.263	451.68	**2 256.99**
LDCF	12.52	26.98	69.97	74.22	171.14		**354.83**
SCCF	1.78	12.02	21.18	21.85	40		**96.83**
Total	**156.59**	**288.57**	**491.81**	**467.58**	**852.41**	**451.68**	**2 708.65**

Source: Sixth national communications.

Note: The column "Other year range within the reporting period" refers to information provided that was not attributable to one specific year within the reporting period 2009–2012.

Abbreviations: GEF = Global Environment Facility, LDCF = Least Developed Countries Fund, SCCF = Special Climate Change Fund.

[a] Figures for the GEF Trust Fund include non-official development assistance (ODA) and ODA/Montreal Fund ODA figures that were reported by some Annex II Parties. As in some cases it was not clearly defined, it cannot be distinguished whether the information provided refers to core/general contributions to the GEF or rather to climate-specific contributions. In cases where Parties provided both information on core/general contributions and climate-specific contributions, both figures were taken into account. In cases where information was provided, for example, for the period 2010–2014 or 2006–2010, such information was included in the category unspecified, as it falls partly outside of the reporting period of the sixth national communications.

308. Table 22 presents the sum of the amounts reported by Annex II Parties in their NC5s and NC6s as provided to the funds under the management of the GEF. Great care must be taken in drawing conclusions when comparing the data from the NC5s and the data from the NC6s because of the reporting issues highlighted in paragraphs 269–271 above and because all of the figures are nominal amounts unadjusted for inflation for each of the four years within the reporting period and for the reporting period as a whole.[61] Despite those caveats, **the sum of the amounts reported by Annex II Parties in their NC6s as provided to the funds under the management of the GEF is lower than the sum of the amounts reported in the NC5s**. Furthermore, the **sum of the amounts reported in the NC6s as provided to the LDCF and the SCCF is higher than the sum of the amounts reported in the NC5s**.

Table 22

Financial contributions reported by Annex II Parties to funds under the management of the Global Environment Facility

(Millions of United States dollars)

Fund	*Total reported in NC5s*[a] *2005–2008*	*Total reported in NC6s*[b] *2009–2012*
GEF Trust Fund	2 952.50	1 805.31
LDCF	60.94	354.83

[61] Financial comparisons across different years are normally undertaken using constant currency units to eliminate the effects of inflation (e.g. 2005 United States dollars).

Fund	*Total reported in NC5s*[a] *2005–2008*	*Total reported in NC6s*[b] *2009–2012*
SCCF	65.85	96.83
LDCF or SCCF (unspecified)	1.39	0.0
Total	**3 080.68**	**2 256.95**

Abbreviations: GEF = Global Environment Facility, LDCF = Least Developed Countries Fund, NC5s = fifth national communications, NC6s = sixth national communications, SCCF = Special Climate Change Fund.

[a] Figures provided in the NC5s column were taken from table 4 of document FCCC/SBI/2011/INF.1/Add.2. Amounts for the years 2009 and 2010 and amounts reported for unspecified years were subtracted from the total as they are, or might be, outside of the NC5 formal reporting period of 2005–2008.

[b] Amounts reported for unspecified years were subtracted from the total as they might be outside of the formal reporting period.

309. For the first time, Annex II Parties provided information on funds provided to the GCF. In addition, information was provided by some Annex II Parties on financial contributions to the Adaptation Fund under the Kyoto Protocol and contributions made in the context of the Kyoto Protocol (see table 23).

Table 23

Reported financial contributions made by Annex II Parties to the Adaptation Fund and the Green Climate Fund

(Millions of United States dollars)

Fund	*2009*	*2010*	*2011*	*2012*	*Other year range within the reporting period*	***Total***
Adaptation Fund	0.18	86.75	21.79	14.80	15.45	**138.97**
Green Climate Fund			0.16	6.12	0.53	**6.81**

Source: Sixth national communications.

310. In line with the UNFCCC reporting guidelines on NCs, Annex II Parties provided information on their contributions to multilateral institutions, such as: the World Bank, the International Finance Corporation, the African Development Bank, the Asian Development Bank, the European Bank for Reconstruction and Development, the Inter-American Development Bank, the United Nations Development Programme, the United Nations Environment Programme and the UNFCCC. Annex II Parties also reported on their contributions to other multilateral institutions, such as the United Nations Convention to Combat Desertification, the World Health Organization, the World Trade Organization, the World Food Programme, the Global Facility for Disaster Risk Reduction, the Renewable Energy and Energy Efficiency Partnership, the Global Energy Efficiency and Renewable Energy Fund, the Climate and Clean Air Coalition to Reduce Short-Lived Climate Pollutants, GCCA, the International Fund for Agricultural Development and the IPCC, among others. Contrary to the information provided in the BR1s, some Annex II Parties did not clearly distinguish whether the respective contributions made were directed specifically at action on climate change.[62] Aggregate information on contributions to multilateral institutions is provided in table 24, following the tabular format suggested in the UNFCCC reporting guidelines on NCs. Differences in the figures reported here versus the information provided in the BR1s, where information on funds provided to multilateral institutions is mandated as part of the CTF tables, may be due to differences between core/general

[62] The reporting of this distinction is not specifically and explicitly mandated by the UNFCCC reporting guidelines on NCs.

contributions versus climate-specific contributions, which in some NC6s were not clearly identified by Parties.

311. Again, great care must be taken in drawing conclusions when comparing the data taken from the third, fourth and fifth NCs with the data from the NC6s provided in table 24, for the reasons explained in paragraph 308 above. Despite those caveats, **the overall sum of the amounts reported in** the **NC6s by Annex II Parties as provided to multilateral institutions is lower than the sum of the amounts reported in the NC5s**. This can be partly explained by the fact that the sum of the amounts reported by Annex II Parties in their NC6s as provided to the World Bank and other multilateral institutions is lower than the sum of the amounts reported in the NC5s. On the other hand, the sum of the amounts reported in the NC6s by Annex II Parties as provided, for example, to the African Development Bank and the Inter-American Development Bank is higher than the sum of the amounts reported in the NC5s.

Table 24

Reported financial contributions made by Annex II Parties to multilateral institutions

(Millions of United States dollars)

Multilateral institution	*NC3s[a] 1998–2000*	*NC4s[a] 2001–2004*	*NC5s[a,b,c] 2005–2010*	*NC6s 2009–2012*
World Bank	6 037.5	3 884.5	15 028.0	11 077.3
International Finance Corporation	360.8	733.9	96.3	462.56
African Development Bank	1 113.1	727.4	1 195.2	3 029.2
Asian Development Bank	1 412.4	1 025.2	1 007.7	1 542.2
European Bank for Reconstruction and Development	326.8	248.7	225.3	185.3
Inter-American Development Bank	373.1	207.7	211.9	651.5
United Nations Development Programme	1 436.7	1 663.9	2 999.1	3 442.7
United Nations Environment Programme	105.6	108.4	292.8	375.2
UNFCCC	20.5	13.8	167.5	59.4
Other	6 297.6	11 012.3	22 810.2	12 777.7
Total	**17 484.1**	**19 625.8**	**44 034.1**	**33 603.1**

Abbreviations: NC3s = third national communications, NC4s = fourth national communications, NC5s = fifth national communications, NC6s = sixth national communications.

[a] The totals in the NC3s, NC4s and NC5s columns were taken from table 5 of document FCCC/SBI/2011/INF.1/Add.2.

[b] The amounts reported in the compilation and synthesis of NC5s covered the years 2005–2010 rather than the formal 2005–2008 reporting period.

[c] Since the NC5s were submitted on 1 January 2010, and because there is usually a two-year lag in the reporting of financial figures, it is unlikely that there is a significant overlap in the reported amounts between the NC5s and the NC6s.

312. A few Annex II Parties provided specific information on their financial contributions to CIFs, as displayed in table 25. As the figures show, the preference for channelling more financial resources through funds that are not necessarily under the Convention, which was already identified in the CS5, is also suggested in the NC6s.

Table 25

Reported financial contributions by Annex II Parties to the Climate Investment Funds[a]

(Millions of United States dollars)

	NC5s[b] *2005–2010*	*NC6s 2009–2012*
World Bank Climate Funds	178.4	644.6
World Bank Climate Funds – Carbon	7.3	
World Bank Climate Funds – BioCarbon		19.0
World Bank Climate Funds – Carbon Finance Assistance	5.6	4.2
World Bank Climate Funds – Clean Energy Investment Framework	3.5	8.7
World Bank Climate Funds – Clean Technology Fund	52.0	1 350.5
World Bank Climate Funds – Forest Carbon Partnership Facility	24.7	186.3
World Bank Climate Funds – Forest Investment Program	7.5	141.0
World Bank Climate Funds – Pilot Program on Climate Resilience	19.4	269.0
World Bank Climate Funds – Scaling Up Renewable Energy in Low Income Countries Program		177.3
Total	**298.5**	**2 800.6**

Abbreviations: NC5s = fifth national communications, NC6s = sixth national communications.

[a] The table shows only the figures that were specifically reported by a number of Annex II Parties. Some other Parties indicated that they had provided contributions to the Climate Investment Funds, but no figures were provided. Information provided in the NC5s column was taken from table 6 of document FCCC/SBI/2011/INF.1/Add.2.

[b] Since the NC5s were submitted on 1 January 2010, and because there is usually a two-year lag in the reporting of financial figures, it is unlikely that there is a significant overlap in the reported amounts between the NC5s and the NC6s.

Information retrieved from Annex II Parties' national communications on bilateral funding

313. Annex II Parties provided extensive information on bilateral funding, as requested by the UNFCCC reporting guidelines on NCs. However, as identified in paragraphs 269–271 above, significant reporting issues can be observed with regard to the information provided on bilateral funding, owing mainly to the different approaches used, for example in terms of the sectoral categories used.

314. Following the approach taken in the CS5 when compiling information on bilateral funding, table 26 contains additional categories for mitigation and adaptation that are not listed in the UNFCCC reporting guidelines on NCs but that may be of interest with regard to information on sectors targeted by Annex II Parties' financial support. Some Parties provided additional information on sectors not specifically listed in table 26. Such information will be made available in detail in the national communications module of the UNFCCC climate finance data portal in due course. Furthermore, some Parties provided information specifically on REDD-plus or on cross-cutting support provided, which is shown in a separate category in table 26 only for the NC6s.

315. Furthermore, differences between the information provided in table 26 and the information contained in the BR1s may stem from the differences in the methodology prescribed in the respective reporting guidelines, but also from the reporting issues identified in paragraphs 269–271 above.

316. Once again, great care must be taken in drawing conclusions when comparing the data taken from the third, fourth and fifth NCs with the data taken from the NC6s provided in table 26, for the reasons explained in paragraph 308 above. Furthermore, an explanation

for the significant differences in the data provided for the fourth NCs is contained in paragraph 56 of document FCCC/SBI/2011/INF.1/Add.2.

317. Despite those caveats, the sum of the amounts reported by Annex II Parties as presented in table 26 suggests that Annex II Parties continued to provide a significant and higher amount of funds through bilateral channels. The sum of the reported amounts in the NC6s as provided for adaptation activities is significantly higher than the sum of the funding reported in the NC5s. Similarly, the sum of the reported amounts in the NC6s as provided for mitigation activities is significantly higher than the sum of the funding reported in the NC5s, in particular in relation to the energy sector. Furthermore, the reported sums suggest that funding for forestry, including REDD-plus, capacity-building and cross-cutting activities was higher in the NC6 reporting period than in the NC5 reporting period.

Table 26

Reported financial contributions made by Annex II Parties through bilateral channels by sector[a]

(Millions of United States dollars)

Sector		*NC3*[b] *1997–2000*	*NC4*[b] *2001–2004*	*NC5*[b] *2005–2010*	*NC6*[b] *2009–2012*
Mitigation	Energy	5 802.70	17 832.80	5 154.91	22 530.17
	Transport	2 215.90	41 176.10	4 864.35	4 032.40
	Forestry	1 057.90	1 228.90	1 132.58	1 816.97
	Agriculture	799.40	7 512.10	345.35	343.89
	Waste	223.40	134.80	280.99	357.41
	Industry	950.10	71 885.60	76.07	105.66
	Capacity-building			15.75	321.16
	Other mitigation			578.02	3454.78
	Total	**11 049.40**	**139 770.30**	**12 448.02**	**32 962.44**
Adaptation	Capacity-building	4 477.70	242.10	155.57	1 633.55
	Coastal zone	713.7	31.20	71.41	205.03
	Other vulnerability	236.8	71.30	525.60	3 242.12
	Land-use planning			0.46	20.40
	Rural development			4.16	120.20
	Water management			916.49	2 035.49
	Other adaptation			272.80	2789.02
	Total	**5 428.20**	**344.60**	**1 946.49**	**10 045.80**
	REDD-plus				1 148.57
	Cross-cutting				10 060.59
	Reported without				486.59
	Grand total	**16 477.60**	**140 114.90**	**14 394.51**	**54 704.06**

Note: In addition to the data reported by Annex II Parties following the sectoral categories as foreseen in the "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications" for adaptation and mitigation, some Parties also reported data under sectoral categories other than the ones identified in the guidelines, or provided information on an aggregate mitigation and adaptation level without indicating subcategories. Information provided in such a manner will be made available in detail in the national communications module of the climate finance data portal and has been summarized under "Other mitigation" or "Other adaptation", respectively. In cases where no category

was specified by the respective Party, such financial data are included under "Reported without category".

Abbreviations: NC3s = third national communications, NC4s = fourth national communications, NC5s = fifth national communications, NC6s = sixth national communications.

[a] The figures in the NC3s, NC4s and NC5s columns are from table 7 of document FCCC/SBI/2011/INF.1/Add.2.

[b] Since the NC5s were submitted on 1 January 2010, and because there is usually a two-year lag in the reporting of financial figures, it is unlikely that there is a significant overlap in the reported amounts between the NC5s and the NC6s.

Information retrieved from Annex II Parties' biennial reports

318. For the first time, Annex II Parties reported extensive information on financial support provided to developing countries using the mandatory electronic application of the CTF tables for BRs.

319. The information contained in the annex to this document shows the total reported financial contribution per Party as retrieved from CTF tables 7. However, as noted in paragraphs 269–271 and 308 above, various reporting issues have been identified. For example, in some cases the information provided in the BR1s does not entirely match the information provided in the CTF tables 7, which form the basis for the information provided in the annex. The data displayed in the annex reflect the data submitted as at 20 October 2014. Information provided by Annex II Parties as part of their BR1s is made available through the BR data interface and is also made available on the UNFCCC climate finance data portal (see para. 1.268 above).

320. Annex II Parties provided information on support directed primarily at mitigation and cross-cutting activities, but also towards adaptation activities. In general, the information contained in the BR1s suggests that the predominant funding source is ODA. Furthermore, it suggests that Annex II Parties mainly used grants as a financial instrument, with concessional loans, equity and non-concessional loans being the minority instruments utilized. The greater part of the funding reported on was marked as "provided" and as climate-specific contributions. Many Parties provided information either in United States dollars or in both United States dollars and their domestic currency. However, various Parties provided information exclusively in their domestic currency.

C. Transfer of technology

1. Overview

Cross-cutting issues and general trends

321. All Annex II Parties provided information on practicable steps taken to promote, facilitate and finance the transfer of, or access to, environmentally sound technologies and know-how to other Parties, particularly developing country Parties, thus giving effect to their commitments under Article 4, paragraph 5, of the Convention. Almost all of the Annex II Parties included a separate section on the transfer of technology in their NC6s and BR1s and many provided examples of concrete technology transfer projects and programmes.

322. In reporting their technology transfer activities, many Annex II Parties, similar to what was reported in the NC5s, differentiated in their NC6s and BR1s between activities undertaken at the bilateral, regional or plurinational and multilateral levels. Many Annex II Parties also mentioned the specific implementing agencies that realized the activities at those different levels. It was also found that since the NC5s the number of technology

transfer activities that focused on supporting adaptation to climate change has increased, while mitigation still accounts for the majority of technology transfer activities.

323. It was noted that 'soft' technologies, such as education, training and capacity-building, formed an integral part of many of the technology projects and programmes. **Partnerships were reported as being an effective means for the implementation of technology projects and programmes** and were also seen to facilitate local ownership.

Technology transfer activities

324. Many Annex II Parties continue to report on engaging bilaterally with developed countries and with developing countries in the undertaking of technology transfer activities. Engaging in technology transfer activities was observed to occur at different stages of the technology cycle in supporting action on mitigation and adaptation to climate change. These stages included the research, development, demonstration, deployment, diffusion and transfer of technology. As a continuation of the trend outlined in the NC5s, **projects and programmes in developing countries reported in the NC6s and BR1s generally focused on the latter stages of the technology cycle**, usually in the form of efforts to share knowledge and foster enabling environments in order to transfer technologies, while many of the efforts with other developed countries tended to focus on the early stages of the technology cycle in the form of the collaborative research, development and demonstration of new climate technologies.

325. Technology transfer activities undertaken by Annex II Parties at the **bilateral level** generally focus on the provision of technical assistance through development projects and programmes in developing countries. Consistent with the findings derived from the NC5s, some Annex II Parties reported increasing their bilateral collaboration with emerging economies.

326. Some Annex II Parties presented examples of technology cooperation at the **regional level**, generally undertaken with the aim of addressing specific regional technology needs. Examples include: the Southern and East Africa Energy and Environment Partnership Programme; the Organization of the Black Sea Economic Cooperation; the Asia Biogas Programme; and the Ibero-American Programme for Science, Technology and Development.

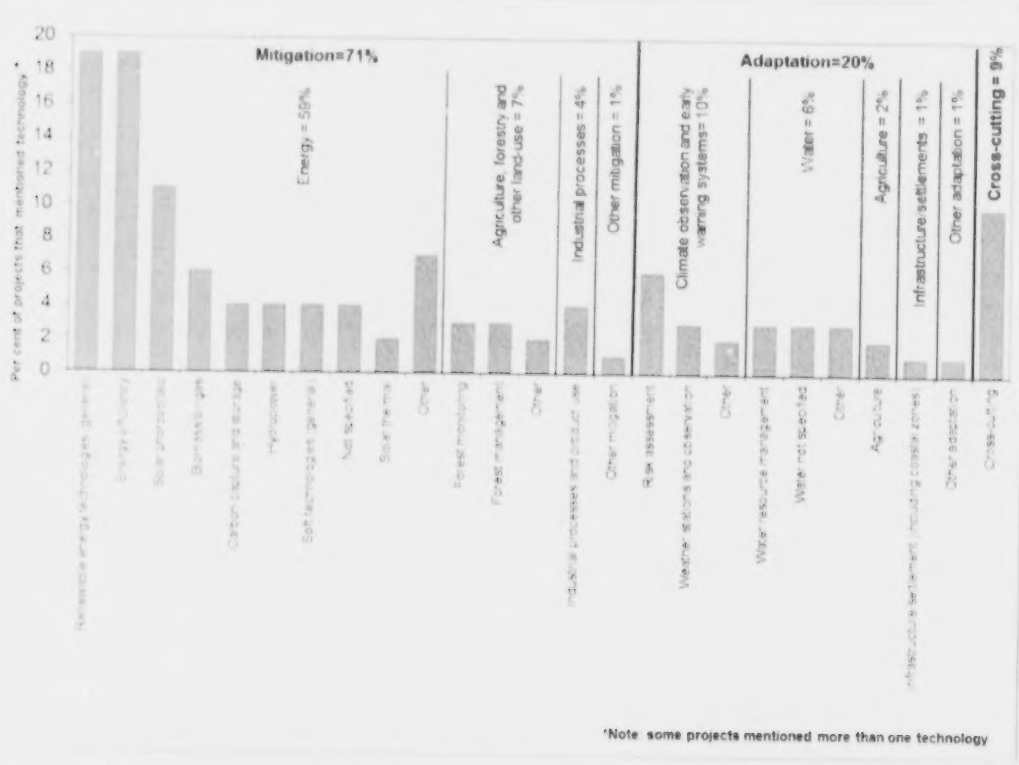
327. Many Annex II Parties reported supporting technology transfer activities through **multilateral cooperation**. The majority of those activities focused on fostering appropriate enabling environments for the deployment and diffusion of particular technologies. In a new development, it was observed that some activities were undertaken via the Technology Mechanism. A **new trend observed from the NC6s and BR1s was the inclusion in many of the activities of an online component** related to information and knowledge sharing, often regarding the strengthening of databases or information platforms to support the transfer of technology. Examples include the Clean Energy Solutions Center, the LATIPAT patent database and the RETScreen clean energy project analysis software.

328. The majority of Annex II Parties reported **concrete examples of technology cooperation activities**. A total of 21 Annex II Parties provided, in table 6 of the NC6 or in CTF table 8 of the BR1, information on more than 170 projects and programmes undertaken with the aim of facilitating and financing the transfer of, or access to, environmentally sound technologies. This is a **significant increase in the number of reported projects** compared with in the NC5s. The majority of those projects and programmes targeted action on the mitigation of GHGs and involved technology transfer in the energy sector, particularly in relation to the deployment and diffusion of renewable energy and energy efficiency technologies (see figure 16). It was also found that since the NC5s **the number of technology transfer projects and programmes that focused on**

supporting adaptation to climate change has increased, while mitigation still accounts for the majority of technology transfer activities.

Figure 16

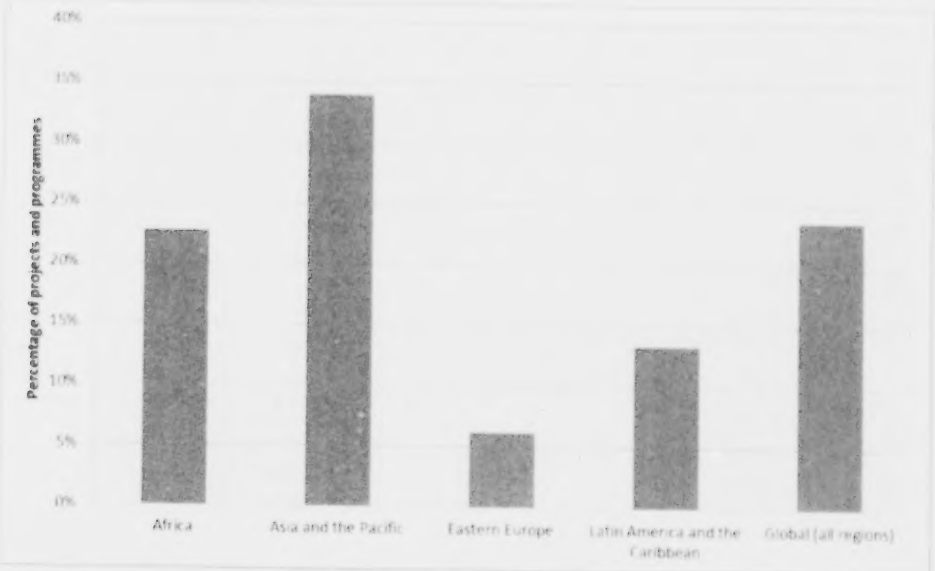
Distribution by sector and technology of technology transfer projects and programmes reported by Annex II Parties



329. Almost all Annex II Parties reported on the **status of implementation of their technology transfer activities**, noting that the majority had already been implemented, with others reported as ongoing or planned. Most of the activities were reported to be implemented by either the public sector or via a joint public–private initiative. In addition, some of the activities were noted to be implemented by the private sector only. **By region**, most of the projects and programmes reported by Annex II Parties were implemented in the regions of Africa and Asia and the Pacific (see figure 17). Since the NC5s, a larger percentage of projects were reported to have been implemented in the region of Latin America and the Caribbean and on a global scale (all regions).

Figure 17

Regional distribution of technology transfer projects and programmes reported by Annex II Parties



330. With regard to the funding of the technology transfer activities, most Annex II Parties reported a **combination of public and private funding**, although some referred to funding from solely public or private sources. Additionally, many Annex II Parties included information **on initiatives and programmes undertaken to encourage, enhance and facilitate private-sector participation**. An example is the cooperation between the Finnish Fund for Industrial Cooperation and Finnpartnership (see box 7).

Box 7

Support for private-sector cooperation on technology transfer activities

The Finnish Fund for Industrial Cooperation (Finnfund) is a state-owned company financing private projects in developing countries by providing long-term capital for profitable projects through loans, equity investments and guarantees. Its climate investments focus on renewable energy investments, enhancing energy and material efficiency, preventing deforestation and supporting the most vulnerable communities in adapting to the adverse effects of climate change. Finnfund has financed projects in Cabo Verde, Honduras, Lao People's Democratic Republic, Sri Lanka and Thailand. Through Finnpartnership, Finnfund also aims to increase business-to-business cooperation between companies in Finland and in developing countries. Finnfund provides funding in the order of EUR 10 million and Finnpartnership approximately EUR 100,000.

2. Technologies and factors contributing to successful technology transfer

331. In terms of the types of technology transferred, some Annex II Parties made explicit reference to 'hard' and 'soft' technologies. However, similar to in the NC5s, most Parties implicitly referred to both types of technology by providing information on the 'hard'

technologies being transferred and on activities relating to 'soft' technologies (such as capacity-building, training programmes and information networks).

332. **'Soft' technologies formed an integral part of many of the technology projects and programmes** reported by Annex II Parties and included activities such as: supporting the creation of enabling environments for private-sector investments; training local officials; supporting education and training to enhance skills in the design, installation, operation and maintenance of technologies; and the strengthening of the capacities of national institutions relevant to technology development and transfer. Examples of such projects and programmes include Nicaragua's Geothermal Capacity Building Project, the Syn-Energy project for Eastern European countries and the Vocational Training Centre for Renewable Energies and Industrial Maintenance in Cabo Verde. An example of a project involving 'soft' technologies for adaptation is the Adaptation for Smallholder Agriculture Programme (see box 8).

Box 8

Adaptation for Smallholder Agriculture Programme

The United Kingdom of Great Britain and Northern Ireland has provided up to approximately USD 235 million for the Adaptation for Smallholder Agriculture Programme (ASAP). The five-year initiative was launched in 2012 and is implemented by the International Fund for Agricultural Development, a specialized United Nations agency working on financing agriculture and rural development. ASAP will work in about 40 developing countries, investing in practices and knowledge sharing to help smallholder farmers adapt to the adverse effects of climate change. This will be undertaken via various technologies and practices, including small-scale water harvesting and storage, flood protection, irrigation systems, agroforestry and conservation agriculture. In addition, ASAP will invest in strengthening access to better seeds, markets and information (including weather forecasts). ASAP will work with governments on improved policies to support agricultural systems that help farmers to adapt to climate change. It is estimated that up to 6 million small farmers will benefit from the effort.

333. Many Annex II Parties reported **success stories relating to technology transfer projects and programmes**, noting the concrete benefits of implemented technology transfer activities. Reported benefits include: achieving quantitative GHG emission reductions in the recipient country; increasing access to modern energy services; reducing the fuel imports of the recipient country; increasing the expertise of local employees; and developing standards and guidelines to improve health, the environment and safety in the recipient country.

334. In reporting such success stories, many Annex II Parties highlighted **factors that contributed to the successful implementation of the projects and programmes**. Factors highlighted by Annex II Parties as contributing to the successful implementation of projects and programmes include the need to: align the projects and programmes with the national policies, plans and strategies of the recipient country; undertake an integrated approach to technology transfer, including capacity-building and awareness components; undertake a market analysis; utilize innovative financing; and develop a strong and capable network for the implementation of the project or programme.

3. Partnerships with relevant stakeholders

335. Another factor that many Annex II Parties continued to report as contributing to the successful implementation of technology transfer activities was partnerships with and between relevant stakeholders. **Partnerships were reported as being an effective means**

for the implementation of technology projects and programmes and were also seen to facilitate local ownership. Many Annex II Parties mentioned the relevant stakeholders involved in the technology transfer activities, while some mentioned partnerships with local stakeholders. It was observed that many of the technology transfer activities reported by Annex II Parties were managed by government agencies and implemented by specialized development agencies through partnerships with relevant stakeholders.

336. Stakeholders identified by Annex II Parties include: developers; owners; suppliers; buyers; recipients and users of technology; financiers and donors; governments; academia and research institutions; international organizations; non-governmental organizations; and community groups. Examples of projects and programmes that highlighted the importance of local partnerships with stakeholders include the Energy and Environment Partnership programme with Central America and the Kenya Climate Innovation Center (see box 9).

337. Some Annex II Parties noted the value of engaging in partnerships between two or more Annex II Parties for the implementation of technology transfer activities in developing country Parties. It was reported that such partnerships could lead to the successful implementation of projects and programmes by building on the comparative strengths of the different partners. An example is the Global Lighting and Energy Access Partnership, supported by Italy, Japan, United Kingdom and United States, which aims to facilitate access to improved lighting services, including by replacing fossil fuel based light sources with solar-powered light-emitting diodes.

Box 9
Kenya Climate Innovation Center

The Kenya Climate Innovation Center (CIC) was launched in September 2012 with a total of USD 16 million of support from Denmark, United Kingdom and the World Bank. As at August 2013, the Kenya CIC was supporting 47 clean technology ventures with mentoring, training and proof-of-concept funding, with over 200 applications in the renewable energy, agribusiness, and water and sanitation sectors. Within the first five years, the Kenyan CIC aims to support over 70 climate technology enterprises and provide over 104,000 households with low-carbon energy by 2015. It also has the objectives of creating up to 4,650 new jobs and supporting the development of local partnerships, supply chains and collaborations.

D. Provision of capacity-building support

1. Overview

338. In accordance with Article 4, paragraph 5, of the Convention, the UNFCCC reporting guidelines on NCs require Annex II Parties to report information on steps taken to support the development and enhancement of the endogenous capacities and technologies of developing countries", with no specific reference to capacity-building.[63]

339. With the evolution of capacity-building as a stand-alone item on the agenda of the subsidiary bodies and the adoption of the frameworks for capacity-building in developing countries established under decision 2/CP.7 and in countries with economies in transition established under decision 3/CP.7, the **attention to capacity-building has increased**. Capacity-building is more and more seen as a means of enabling developing countries and

[63] The expression "capacity-building" is mentioned in a footnote, and is part of a list of practices and processes related to "soft" technologies; see document FCCC/CP/1999/7, paragraph 55, footnote 3.

countries with economies in transition to implement effectively their commitments under the Convention, as reflected in Annex I Parties' reporting.

340. Compared with in the NC5s, **more Parties included in their NC6s specific sections on capacity-building** or highlighted information on capacity-building in chapters focused on other thematic areas such as adaptation, mitigation, financial resources and transfer of technology. On the other hand, some Parties indicated their **difficulty in reporting on capacity-building as a stand-alone activity outside of financial support and support for technology transfer** and related projects. Those Parties underlined the importance of integrating capacity-building activities into projects and/or programmes as that helps to ensure that the capacity being built is relevant, effective and tied to results.

341. The evolution of capacity-building under the Convention is also reflected in the UNFCCC reporting guidelines on BRs, which request Annex II Parties to report qualitative and quantitative information on capacity-building (CTF table 9, contained in the annex to decision 19/CP.18).

342. Of the 24 Annex II Parties that submitted their BR1s, 19 have filled CTF table 9 with extensive information on the provision of capacity-building support to developing countries. Five Parties did not complete the table, of which two did not provide any explanation, one referred to CTF table 9 but omitted to include it and two explained that they deliberately decided not to provide any data in CTF table 9 since capacity-building is integrated into all of the projects that they support and therefore it was not possible to report it separately.

343. Although the UNFCCC reporting guidelines on BRs are not applicable to Annex I Parties that are not included in Annex II to the Convention, some such Parties reported on bilateral support provided to projects with capacity-building components.

344. Submitted NC6s and BR1s contain extensive information on the provision of capacity-building support to developing countries. Annex II Parties report having **intensified their efforts in providing enhanced support for adaptation, mitigation and enabling environments**, including through their **increased participation in multi-stakeholder cooperation projects** involving actors from the public sector, the private sector and civil society.

2. Types and areas of capacity-building support provided

345. Support provided by Annex II Parties is targeted at enhancing institutional, systemic and individual capacity at the local, national, regional and subregional levels. When formulating their support for mitigation and adaptation activities, most Parties emphasize a **country-driven approach, which is based on national priorities and needs**. In several instances, **capacity-building support cuts across different climate change related areas, such as poverty reduction, food security, meteorology and health**.

346. The information on capacity-building reported by Annex II Parties in their NC6s and BR1s covers all of the **needs and priority areas identified in the framework for capacity-building in developing countries**.[64] Support is mainly provided in the following areas, with most capacity-building related activities being reported in the area of adaptation:

(a) Capacity-building for the implementation of adaptation measures;

(b) Assessment for the implementation of mitigation options;

(c) Enhancement and/or creation of an enabling environment.

[64] Decision 2/CP.7, annex, paragraph 15.

347. Many Parties pointed out their **enhanced support for adaptation**, with most efforts geared towards capacity needs to enhance the resilience of vulnerable communities to longer-term climate change impacts. Capacity-building support for adaptation cuts across related domains such as vulnerability assessment, disaster risk reduction, development and transfer of adaptation technologies, and education, training and public-awareness programmes for rural communities, taking also into account gender considerations.

348. **Capacity-building for mitigation focused increasingly on the provision of technical assistance and advisory services** through bilateral and multilateral channels to promote low-emission development strategies in recipient countries. Capacity has been built at the institutional, systemic and individual levels to enable the promotion of energy-efficiency policies and the transfer of renewable energy technologies. Another area which saw increasing support from Annex II Parties is the development of capacity for forest carbon measurement and monitoring, with a view to effectively promoting strategies, implementing policies and conducting technical research on REDD-plus.

349. **Parties have intensified their efforts in enhancing enabling environments** in developing countries and supporting them in putting policies, regulations and infrastructure in place for the development and implementation of diverse projects in the areas of climate change adaptation and mitigation. Capacity has also been built to facilitate access to financial resources. Several Parties, noting the key role that private investment can play in formulating mitigation and adaptation projects, invested capacity-building efforts in enhancing innovative financing approaches, so as to enable developing countries to attract funding from private sources.

350. Fifteen Annex II Parties reported on **capacity-building support provided to EIT Parties** according to the priority areas identified in the relevant capacity-building framework.[65] Support is mostly provided for the transfer of environmentally sound technologies. Annex II Parties actively promote the development, deployment and diffusion of mitigation technologies, including in the context of JI under the Kyoto Protocol. Some Parties reported multi-stakeholder initiatives to foster innovative investment projects in EIT Parties, with a view to accelerating the diffusion of climate-friendly technologies and practices.

3. The role of partnerships in enhancing the provision of capacity-building support

351. Annex II Parties not only provided extensive information on bilateral support provided, but also reported on their **increased participation in multi-stakeholder cooperation projects and interregional network initiatives** at the national, regional and subregional levels.

352. The wide spectrum of stakeholders participating in such projects and networks includes actors from: the public sector (national governments, public institutions, cities and municipalities, intergovernmental organizations, bilateral development partners and academic institutions); the private sector (owners, suppliers, buyers and financial players); and civil society (non-governmental organizations and community groups). An example of a global partnership supporting the development and implementation of adaptation and mitigation activities is GCCA (see box 10).

353. Several Annex II Parties reported on examples of **public–private partnerships with mutual environmental goals**. Such joint efforts are considered instrumental in building the capacity to integrate the regulatory reforms which are necessary to adopt green policies and innovative development strategies into the existing policy, systemic and institutional environments of developing countries.

[65] Decision 3/CP.7, annex, paragraph 20.

Box 10

The Global Climate Change Alliance

The Global Climate Change Alliance (GCCA) was launched in 2007 by the European Commission to strengthen dialogue and cooperation on climate change between the European Union and the least developed countries and small island developing States, with a view to helping them to develop and implement adaptation and mitigation activities. GCCA is currently supporting programmes to address climate change in 30 countries and four regions across the globe, and work is under way to formulate an additional nine programmes.

The objective of GCCA is to promote exchanges of experiences in relation to practical approaches to integrating climate change into development policies and budgets in the following five priority areas:

- Mainstreaming climate change into poverty reduction and development efforts;
- Adaptation;
- Reducing emissions from deforestation and forest degradation;
- Enhancing participation in the global carbon market;
- Disaster risk reduction.

GCCA works in cooperation with government institutions and agencies, regional organizations, non-governmental organizations, academic and scientific institutions, and multilateral and bilateral development agencies.

Annex

Financial contributions in 2011 and 2012 reported in common tabular format table 7 submitted by Annex II Parties as at 20 October 2014

		Contribution to total					Contribution to total			
Party	Total contribution in 2011 (million USD)	Multilateral climate change funds (per cent)	Multilateral financial institutions, including regional development banks (per cent)	Specialized United Nations bodies (per cent)	Bilateral, regional and other channels (per cent)	Total contribution in 2012 (million USD)	Multilateral climate change funds (per cent)	Multilateral financial institutions, including regional development banks (per cent)	Specialized United Nations bodies (per cent)	Bilateral, regional and other channels (per cent)
Australia	509.72	17.3	59.5	4.0	19.2	553.13	17.3	51.2	4.9	26.7
Austria	43.57	0.0	34.1	0.0	65.9	57.86	0.0	27.5	0.0	72.5
Belgium	43.32	82.8	0.0	4.7	12.5	36.54	73.9	1.2	11.5	13.4
Canada	506.07	10.9	65.5	9.5	14.0	492.23	12.2	59.7	9.7	18.4
Denmark	396.10	10.9	40.6	21.0	27.5	401.28	6.4	42.6	16.9	34.1
European Union	873.95	0.0	0.0	0.0	100.0	943.11	0.0	0.0	0.0	100.0
Finland	438.62	8.0	45.7	36.1	10.2	645.57	8.3	59.9	25.0	6.9
France	3 980.38	2.2	0.3	26.2	71.2	4 427.69	1.9	0.0	21.2	76.9
Germany	2 213.87	8.9	9.5	0.0	81.5	2 192.07	6.8	9.5	0.0	83.7
Greece	21.09	0.0	0.0	3.9	96.1	0.61	0.0	0.0	0.0	100.0
Iceland	12.26	1.2	28.7	56.7	13.4	14.11	1.1	26.5	50.8	21.6
Ireland	102.68	16.2	38.2	0.0	45.7	75.45	2.4	41.0	0.0	56.6
Italy	425.51	2.0	65.0	8.3	24.7	318.07	0.7	76.1	7.5	15.8
Japan	4 799.00	15.7	3.0	1.8	79.6	4 798.47	15.9	3.8	1.8	78.5
Luxembourg	38.70	12.1	5.1	9.3	73.4	48.49	3.9	8.8	4.5	82.8
Netherlands	1 762.88	4.1	69.6	14.3	12.1	1 765.96	8.8	62.1	15.1	14.0
New Zealand	60.40	4.3	40.8	10.8	44.1	61.49	3.5	25.1	11.0	60.4

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Party	Total contribution in 2011 (million USD)	Contribution to total: Multilateral climate change funds (per cent)	Contribution to total: Multilateral financial institutions, including regional development banks (per cent)	Contribution to total: Specialized United Nations bodies (per cent)	Contribution to total: Bilateral, regional and other channels (per cent)	Total contribution in 2012 (million USD)	Contribution to total: Multilateral climate change funds (per cent)	Contribution to total: Multilateral financial institutions, including regional development banks (per cent)	Contribution to total: Specialized United Nations bodies (per cent)	Contribution to total: Bilateral, regional and other channels (per cent)
Norway	1 044.40	3.3	41.0	22.2	33.5	1 309.55	2.1	39.7	19.0	39.2
Portugal	58.05	0.0	61.0	1.7	37.3	35.28	0.3	45.0	1.9	52.8
Spain	865.04	17.5	56.7	5.1	20.7	349.23	0.0	20.9	4.1	75.0
Sweden	1 504.87	12.7	47.4	19.4	20.5	1 488.53	9.2	46.2	21.6	23.1
Switzerland	624.13	3.2	60.3	17.4	19.1	624.89	2.3	57.7	15.6	24.4
United Kingdom	3 424.26	16.5	58.5	19.6	5.4	3 598.74	7.1	62.2	19.0	11.7
United States	5 006.62	7.4	33.5	2.7	56.4	4 624.81	10.0	47.4	2.9	39.7
Total	**28 755.50**					**28 863.17**				